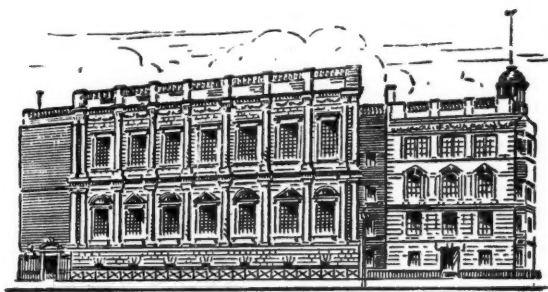


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Admission to the general public is 1s.; Saturday after Noon, 6d.

SECRETARY'S NOTES

August, 1929.

Council.

Rear-Admiral E. A. Astley-Rushton, C.B., C.M.G., has been elected as a Naval Member of the Council in succession to Rear-Admiral W. M. James, C.B., who has resigned on taking up an appointment afloat.

Rear-Admiral W. F. French, C.M.G., has been elected as a Naval Member of the Council in succession to Vice-Admiral W. H. D. Boyle, C.B., who has become an *ex-officio* Member.

Colonel B. Abel Smith, D.S.O., M.C., T.D., A.D.C., has been elected as a Territorial Member of the Council in succession to Colonel the Duke of Northumberland, K.G., C.B.E., M.V.O., who has resigned.

New Members.

The following Officers joined the Institution during the months of May, June and July:—

ROYAL NAVY.

Acting Sub-Lieutenant G. W. Rowell, R.N.

Lieutenant R. H. Barrett, R.N.

Lieutenant J. H. Kenworthy, R.N.R.

Commander Sir Graham J. Bower, K.C.M.G., R.N. (retired).

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Lieutenant-Commander R. V. Symonds-Tayler, D.S.C., R.N.

ARMY.

Major E. R. C. Wilson, M.C., R.A.

Lieutenant-Colonel C. S. Steele-Perkins, V.D., Calcutta Light Horse.

Lieutenant B. A. Innes, The Black Watch.

Major E. H. B. Usher, M.C., R.A.

Lieutenant G. M. Elias-Morgan, The Queen's Royal Regt.

Colonel H. J. Huddleston, C.B., C.M.G., D.S.O., M.C., Dorset Regt.

Captain L. B. Jones, Rajputana Rifles.

Major H. J. D. Clark, M.C., Argyll and Sutherland Highlanders.

Lieutenant A. E. Bagwell-Purefoy, R.A.

2nd Lieutenant G. L. S. Scott, Indian Army.

Major H. J. Holness, D.S.O., R.A.V.C.

Captain D. McCallum, M.C., East Yorkshire Regiment.

Captain W. L. Alston, 2nd Bombay Pioneers.

Captain H. G. O. Downing, Devonshire Regt.

Major C. H. Woodhouse, M.C., Dorsetshire Regt.

Lieutenant L. C. D. Ryder, Norfolk Regt.
Colonel E. L. W. Henslow, O.B.E., M.C., late Wilts. Regt.
Colonel L. H. R. Pope-Hennessy, C.B., D.S.O., late Oxford and Bucks.
Captain A. S. G. Douglas, O.B.E., the Rifle Brigade.
Captain G. W. McCarthy, Royal Irish Fusiliers.
Major H. Pelham Burn, late Rifle Brigade.
Gentleman-Cadet R. E. J. Danbery.
2nd Lieutenant C. H. Barnett, R.E.
2nd Lieutenant N. M. W. Kyle, Baluch Regt.
Lieutenant J. E. C. McCandlish, R.E.
Captain F. S. Morgan, Royal Signals.

ROYAL AIR FORCE.

Flight Lieutenant A. O. B. Stone, R.A.F.
Flight Lieutenant W. A. D. Brook, R.A.F.

Programme of Lectures.

The Programme of Lectures for the 1929-30 Session is well advanced, and copies will be sent to all Members shortly.

Gold Medal Essay, 1929.

Competitors are reminded that essays which are being submitted for the Gold Medal, 1929, should reach the Secretary, typewritten and in triplicate, on or before the 15th November, 1929.

Members joining in October.

The attention of potential Members is invited to the fact that if they join on or after 1st October of the current year, they are not called upon for any further subscription until January, 1931.

Special Facilities for Junior Officers.

The special attention of Members is invited to the new Bye-Law governing the entrance of Junior Officers to the Institution, which was passed at the last Annual General Meeting. The terms are as follows:—

"Commissioned Officers of the Home, Dominion, Indian and Colonial fighting Services and their Reserves, of three years or less seniority as such; Midshipmen, R.N., R.N.R. and R.N.V.R.; and Naval, Military and Air Force Cadets, shall be admitted to Membership without Entrance Fee on payment of the first annual subscription of £1 5s.

"In all cases eligibility for such Membership shall be governed by para. 1 of Chapter 2.

"An Officer who is admitted without entrance fee and who subsequently fails to pay his annual subscription regularly or resigns, shall not be re-admitted without payment of such fee, notwithstanding the fact that he may, by virtue of his rank or seniority, be otherwise eligible for such concession.

"Officers joining under this Bye-Law will date their Membership from 1st January of the year in which they join. They shall not have the privilege of becoming Members in October and of paying no subscription on the ensuing 1st January."

JOURNAL.

Notes for Guidance of Contributors.

The Editor has been asked to publish some notes for the guidance of those who desire to offer contributions to the JOURNAL. The following are the principal points to which attention is invited:—

- (1) Preference will be given to articles which assist in the "promotion and advancement of naval and military science and literature" in practical form and which are written with an up-to-date and first-hand knowledge of the subject with which they deal.
- (2) Historical articles should point some definite lesson for the present or future and not merely recapitulate accounts of episodes of the past.
- (3) Articles of interest to students of war in all three Services are preferable to those of a highly technical nature or of such restricted interest that they could only appeal to a very limited number of our readers.
- (4) As a general rule articles should not exceed 3,000 words in length. Apart from considerations of space, experience shows that the short article which makes its points concisely is more effective and more widely read than one of a long and rambling character.
- (5) Contributions intended for the JOURNAL should be addressed to the Editor. They should, if possible, be typed (double spacing), but short articles in legible manuscript can be accepted if a typewriter is not available.
- (6) The Editor is authorized to obtain official sanction for the publication of articles written by serving officers; it must be clearly understood that nothing written by such officers can be accepted for the JOURNAL without this sanction being obtained.
- (7) Except where contributors are good enough to offer articles without remuneration, this will be paid at the authorized rates.
- (8) Attention is invited to the note on the first page of each JOURNAL regarding authors alone being responsible for their opinions: also to the notice at the head of "Correspondence."

MUSEUM.

Special Exhibition.

A Special Exhibition of aircraft models was opened on the 5th August. For further details, see page 525 of this JOURNAL.

It is intended to continue an aircraft model Exhibition until about the end of January, but the actual models will be changed from time to time to show different aspects of the development of aviation.

Additions.**PERMANENT.**

- (8286) Token struck in 1814 to commemorate Napoleon's banishment to Elba.
- (8287) Khalifa's saddle, brought back from the Battle of Omdurman by Captain The Hon. R. H. de Montmorency, V.C., 21st Lancers.
- (8288) Tunic worn by Sir William Gordon, Bart., 17th Light Dragoons, in the Charge of the Light Brigade at the Battle of Balaclava.
- (8289) Naval Print. Peace. The result of our Naval Victories, 1801.
- (8290) Portrait of Sir Evan Nepean, Bart.
- (8291) Three water colour paintings depicting H.M.S. "Sphinx," H.M.S. "Mersey" and H.M.S. "Chesapeake," respectively.
- (8292) Print showing the spars, rigging and interior of a Steam Line of Battleship, 1865.
- (8293) Engraving by J. Basire, Le Champ de Drap d'Or.
- (8294) Piece of a Colour which formerly belonged to the Royal Regiment during the Peninsula War, and was found on one of the battlefields.

LOAN.

- (3580) Russian Naval Ensign from "The Twelve Apostles," sunk across Sebastopol Harbour.

Attendance.

The amount taken for the past Quarter was:—

£141 6s. od. in May.

£136 2s. od. in June.

£181 5s. 9d. in July.

Purchase Fund.

This Fund was opened with the object of purchasing suitable exhibits, which from time to time are offered to the Museum, or are put up for sale at various auctions. The Council hope that it will receive support from Members of the Institution who are interested in the Museum.

Balance in hand	£39 12 5
N. A. N. Budd, Esq.	1 1 0
Proceeds of Sale of Surplus Exhibits	12 15 0

£53 8 5



Reproduced from the Artist's book

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A GREAT "OPPOSED LANDING,"

Suvla Bay, 1915

The Welsh Territorials' Casualty Clearing Station, "A" Beach

From the original picture by Norman Wilkinson, R.I.

THE JOURNAL

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[Authors alone are responsible for the contents of their respective Papers.
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should be addressed to the Secretary, Royal United Service Institution.]

JAPAN'S POSITION IN THE FAR EAST

By SADAŌ SABURI, *Chargé d'Affaires, Japanese Embassy.*

On Wednesday, 12th December, 1928, at 3 p.m.

FIELD-MARSHAL VISCOUNT ALLENBY, G.C.B., G.C.M.G., D.C.L., LL.D.,
in the Chair.

THE CHAIRMAN introduced the Lecturer.

LECTURE.

EARLY European adventurers who first established contact with the Far East can have had little idea of the prominent position which the Pacific Ocean, the islands which it encircles and the vast territories which lie along its borders were destined to occupy upon the international stage. The East, passive no longer, but growing more and more self-conscious, is contesting the domination of the West, and the opinion is widely held that the future peace of the world is largely dependent upon a happy and peaceful solution of the Pacific problem which, whether it be regarded from a world point of view or from a local standpoint, presents many complications. It is consequently a matter of some importance to understand Japan's position in the Far East. I will endeavour to fulfil the task that is before me, though not without some misgiving, and I count upon your indulgence.

I propose to approach the subject from four aspects—geographical, social, economic and political, though the two last-named, being inter-dependent, may conveniently be discussed together.

THE GEOGRAPHICAL ASPECT.

Geographically, the position of Japan in the East may be said to be identical with that of Great Britain in the West. Both are island countries. Both lie close to a great continent, and both have on their opposite flank the vast and enormously rich American Continent from which they are separated, respectively, by the Pacific and Atlantic Oceans.

Moreover, Manchuria with an area of 364,000 square miles and a population of 13,000,000, on the Asiatic mainland, has the same strategic importance for Japan as Belgium, on the European Continent, has for Great Britain, a matter to which I shall have occasion to refer later.

The total area of the Japanese Empire is 260,000 square miles with a population of 83,000,000 (of whom 63,000,000 reside in Japan proper, the extent of which is 147,000 square miles). Her nearest neighbours, China, Russia and the United States of America, present an interesting contrast, China having an area of 4,279,000 square miles and a population of 400,000,000, while the corresponding figures for Russia and the United States of America are 8,186,000 square miles and 140,000,000 inhabitants, and 3,738,000 square miles and 118,000,000 inhabitants.

Japan proper is a mountainous and volcanic country; thus the area of arable land is very limited. Its rivers are short and generally rapid. Only three in Japan proper are 200 miles in length and are mere streams by comparison with the mighty Yangtse Kiang in China, which flows for more than 3,000 miles and is navigable for steamships for a distance of 1,400 miles.

The islands are subject to frequent earthquakes; while typhoons and floods are of annual occurrence. These are enormous economic disadvantages, although some think they should be regarded as moral assets in strengthening the character and resistance of the people. The one natural advantage is the long coast-line.

THE SOCIAL ASPECT.

The East is often styled "mysterious," but, in reality, there is little mystery about Japan where the social order, during a period of something like a thousand years before the Restoration in 1868, resembled that of Europe in mediæval times.

Japan possessed a feudal system, which, compared with that of Europe, was more humane in its conception and more lenient in its operation. The reason for this was fundamental and is explained in the Imperial Rescript issued on the occasion of the Coronation of the 124th Emperor, on 10th November, last, as follows:—

"In building up the Empire and in reigning over the people, Our Ancestors looked upon the State as Their Household and the

people as Their very children. This tradition has been followed from era to era so the virtues of benevolence and magnanimity shown by their Sovereigns have deeply influenced the people who in turn are united in reverence and loyalty to the Throne. This spiritual union between Sovereign and people is indeed the essence and flower of our nationality and should remain unchanged as heaven and earth."

This feudal system reached its zenith about the beginning of the XVIIth century, and during the ensuing period of about three hundred years, Japan, under the Tokugawa Shogunate, enjoyed an era of unbroken peace unparalleled in the history of any other nation. Art and literature flourished, but foreign relations and international affairs were entirely ignored. So far as the world outside Japan was concerned, the people were fast asleep. A different situation was created when foreigners began to force an entrance into Japanese seclusion, and a radical change in the political system was initiated when, in 1868, the feudal system was abolished and the Great Emperor Meiji took and proclaimed the Oath of the Five Articles, which ran :—

- (1) Public councils shall be organized and all Governmental affairs shall be decided by public opinion.
- (2) All civil and military officials shall with one heart devote themselves to the advancement of the national welfare.
- (3) All antiquated customs of former times shall be abolished, and justice and equity, as they are universally recognized, shall be followed as a basis of action.
- (4) All civil and military officials, as well as common people, shall be allowed to realize their aspirations.
- (5) Knowledge shall be sought throughout the world, and thus the Empire shall be placed upon more solid foundations.

The break with the past, though revolutionary in its character and effect, was not forced on the Crown, but was the outcome of the recognition by Sovereign and people alike of the weaknesses of their ancient civilization when brought into contact with modern western conditions, and their determination to combine their efforts to eradicate defects and strengthen their native land.

It was the united effort and sacrifices of all classes of the people that brought about this radical transformation. The Shogun, hitherto the *de facto* head of the State, voluntarily gave up his power; the feudal lords forfeited their lands; and the military Samurai resigned their much prized privileges. The task of reconstruction was arduous. An army and a navy had to be formed, a complete State organization had to be established to cope with modern requirements, and numberless

social reforms had to be introduced. The first of these was the adoption of a modern system of education, and so well has this been developed that to-day 99½ per cent. of the child population attends the elementary schools, and illiteracy is practically negligible.

The principles of good citizenship, on which Japan's educational system is built, are well set forth in the 1890 Rescript on Education, from which I quote :—

" Be filial to your parents, affectionate to your brothers and sisters ; as husbands and wives be harmonious ; as friends, true ; bear yourselves with modesty and moderation ; extend your benevolence to all ; pursue learning and cultivate the arts ; and thereby develop your intellectual faculties and perfect your moral powers ; furthermore, advance the public good, and promote common interests ; always respect the Constitution and observe the laws ; should emergency arise, offer yourselves courageously to the State."

I have already shown how the first of the Five Articles of the Oath of the Emperor Meiji gives to public opinion the decisive voice in the affairs of Government. Compared with the centuries of experience in this country, we are still in a very early stage of domestic political evolution. With us, public opinion as an instrument for the control and direction of Government is still a comparatively novel device, and the problem, which education and experience alone can solve, is still serious.

As regards the outside world, however, a considerable difference is to be noted. From the moment when Japan's doors were opened, the people were keenly alive to the dangers that threatened their independence and security, and were deeply interested in everything that was intended to contribute to their protection.

Moreover, because of Japan's limitations in the economic field—a question which I shall discuss later in more detail—her relations with the outside world are of vital importance to her, and her continued ability to live is absolutely dependent on her contact with other nations. This is known to all her people, and it is their keen appreciation of the situation which prompts their great interest in foreign affairs, and which is doubtless responsible for the fact that they have not been slow to learn the lessons of experience.

Let me give you an illustration gained from personal experience.

When the Japanese Delegation left for the Paris Peace Conference in 1919, they went with the impression that Japanese public opinion demanded that efforts should be primarily directed towards protecting Japanese interests. On the other hand, when three years later the Japanese Delegation went to Washington for the Disarmament Conference,

they were fully convinced that Japanese public opinion was not centred on the special interests of Japan but was desirous of a just and expedient world settlement.

This striking change from a national to an international point of view, from a competitive idea to a co-operative ideal, from suspicion to confidence, had come about in the short space of three years. So striking is it that it merits further explanation. The modern development of Japan falls into two main phases: first, what I may call the political phase, in which the problem of security is paramount, and second, the so-called economic phase, in which the question of economic existence and industrial development is predominant. In the former, Japan's chief problem was, as I have said, security, which compelled her to concentrate her energies mainly on her army and navy, and on the development and training of her people to face the new conditions of existence which forced her to fight two great defensive wars.

The period of the Great War intervened between these two main phases, and was, so to speak, a period of transition. On the one hand, Japan was still not a little apprehensive regarding the question of her security, while, on the other, the problem of assuring the economic life of her people was beginning to press for solution. It was, therefore, a time of great political and economic uncertainty, which was responsible for certain activities in China and Siberia.

But once the Great War was over, nations turned their attention to problems of peace and to economic reconstruction and development. So, in Japan, it is now recognized that, as one result of the war, and with the increase of international sympathy and confidence, the question of political security has been solved, and the nation's energies can now be concentrated on the problem of economic existence.

International relationships rather than national ambitions are now engaging her attention, and public opinion is awakening in this direction. The Japanese are more and more desirous of playing their part in the international field, realizing that what promotes international peace and mutual understanding benefits themselves, and that their economic prosperity is closely interwoven with the economic welfare of the rest of the world.

Nevertheless, although this change took place within the space of three years, it must not be imagined that it has since advanced and will in future advance with equal rapidity and intensity. In the development of all nations there is an ebb and flow of ideas which, in the normal course, checks too rapid a progress in people's thoughts. In Japan, as elsewhere, there have been and will be alternating periods of reaction and advancement, but, according to my understanding of

Japan to-day, public opinion in regard to foreign affairs is taking definite form along liberal lines.

THE ECONOMIC AND POLITICAL ASPECT.

Japan's entry into the modern world actually dates from the surrender of the Shogun to the Emperor in the year 1868. At that time, Japan had no industry, no commerce, no army nor navy, no modern science and no modern means of communication; while her position *vis-à-vis* the foreign Powers was virtually the same as that of China. She already had commercial treaties; she had to concede extra-territorial rights; she had to undertake unilateral restrictions in the matter of Customs tariff.

Dissatisfied with these arrangements that she had been obliged to make with foreign Powers, and recognizing that the weakness of her international position was only the result of her own internal weakness, she resolutely fixed her mind on completing all reforms needed in her domestic administration. She codified her laws and established modern tribunals, with the result that in the year 1899—after a lapse, that is, of barely thirty years—the foreign Powers voluntarily gave up their extra-territorial jurisdiction, and in 1911 recognised Japan's tariff autonomy. The transformation is now complete. Japan no longer fills the role of a recluse, and, as I have already intimated, her continued ability to live is, for economic reasons, dependent upon her contact with other countries. The reason is not far to seek. Our natural resources are very slender. We have no iron, very little coal and even less oil. Our acreage is small and our supply of food-stuffs is inadequate. On the other hand, we have a large surplus population for whom we have to find food and work.

The remedies suggested to meet this situation are several. Those which have attracted most attention are emigration, birth control, increased industrialization and further intensification of agriculture.

Of these, that which was commonly held to be most advantageous and respecting which the Japanese people were most sensitive is emigration. But emigration offers no satisfactory solution in present conditions. Our annual net increase of population is between 800,000 and a million, but we have difficulty in placing 10,000 abroad in the face of existing restrictions. The total number of Japanese residing abroad is only 650,000.

At one time, some people thought that these restrictions might create serious complications, and some went so far as to think that they might some day be a cause for war. But this is not the case. Japan recognises the inherent sovereign power of each state to limit and control immigration

in its own domains, but she objects to any discrimination made against her people. The emigration problem between the United States and Japan which caused so much discussion between the two countries and not a little apprehension to outsiders, is, in fact, reduced to a question of a quota for Japan in common with other nations. If this principle were admitted only one hundred Japanese would go into the United States annually against a yearly total of several hundred thousand immigrants from other parts of the world. This, so far as Japan is concerned, can never be a cause for war. Moreover, Japan's settled policy is not to send her people where they are not welcome.

Though Japan is already over-populated, it will take a long time before the so-called saturation point is reached, if her supply from abroad of food-stuffs for her people and raw materials for her industries is adequate and her commerce is fairly and equitably treated. Given these conditions, the problem of emigration of the people is not as urgent as is generally supposed. The work of their hands goes abroad instead, and meantime we place our faith in the changes which are occurring in the psychology of nations to ensure that the favourite arguments of the opponents of migration—non-assimilability, racial inferiority, and lower standard of living—will be assessed at their proper value.

Birth control is a subject of much controversy in Japan, but I am not inclined, nor have I sufficient knowledge, to discuss the pros and cons of it here.

To my mind, industrialization is our only real remedy. The problems are many and various, but we are not disposed to lose courage because of their urgency. Like the British, we have the great advantage of easy access to the sea, and like the British we are determined to rely on our own efforts to overcome our difficulties. A single example will suffice to elucidate my meaning. There was no cotton in Japan, but by dint of sheer industry and excellent organization, we have established a flourishing cotton trade and have secured a huge market in China and other parts of the world.

Other industries are likewise developing according to their several potentialities. The value of our imports and exports has increased from forty-nine million yen in 1873 when statistical returns were first issued, to more than four thousand million yen in 1927. We are sparing no efforts to intensify our agriculture all over the country and to develop Hokkaido, the most northerly of the four islands comprising Japan proper. We have vastly improved agricultural conditions in Formosa and Korea. Lastly, we have been untiring in our endeavours to accelerate the economic development of Manchuria in conformity with our legal rights and the principle of the open door and of equal opportunity.

This brings me to what is perhaps one of the most important aspects of my lecture, namely, Japan's relations with China.

A few figures will enable you to realise the significance of China to Japan, firstly, as a source of the raw materials that Japan so greatly needs, and secondly as a market for Japan's manufactures.

On the basis of the Chinese Customs returns for the last three years, Japan's share of China's foreign trade (imports and exports) amounts to between 30 and 31%, America's share being between 15 and 17%, and Great Britain's averaging 8%. Japan's share is, therefore, about double that of the United States and more than three times that of Great Britain. Correspondingly, China looms very large in Japan's export trade returns, for in 1926 China ranked next to the United States as a market for Japanese goods, taking 27% of the whole of Japan's export trade for that year. The relative importance of Chinese trade to each of the three countries mentioned is clearly demonstrated by the fact that trade with China represents 27% of Japan's total exports, while it represents only 2% of British and American exports.

It should be noted, however, that the share of the entire British Empire, including Hong Kong, in China's foreign trade, calculated on the average of the past three years, is roughly 30% of the whole, but it must be remembered that the Hong Kong trade returns include imports and exports of other countries to and from China passing in transit through Hong Kong so that the trade of Hong Kong with China is not wholly British Empire trade. About 30% of Hong Kong's trade is Japanese and a further percentage belongs to other countries.

This comparison of trade statistics explains, in part, the nature and variety of the problems that Japan has to settle with China. If Japan cannot reach a settlement with China as quickly as other nations, the delay is by no means due to Japanese unwillingness to settle. The point is apt to be overlooked that not all countries have the same degree of political or economic interest in China. Moreover, for Japan, on account of her propinquity and for other reasons, the problems are vital; for other countries they are important; and for others again merely interesting. The solution of them, therefore, is more difficult for Japan than for other nations. Delay, as I have said, does not mean unwillingness to settle, for it is of supreme importance to Japan that peace and good order should be restored in China, and that China should be given every opportunity of developing her resources. Japan has a natural sympathy for her neighbour's efforts to attain her legitimate national aspirations, and realizes that a United China, under a stable Government, taking her place beside the other nations of the world, is an additional guarantee of the peaceful and progressive development

of the Far East. It does not in any way benefit Japan if China lacks stability and prosperity.

Unfortunately, since the Revolution of 1911 internal disorder has been rife in the provinces of China, the only exception being Manchuria, which, thanks to the fact that for the past twenty years it has been immune from the troubles prevalent elsewhere, has been transformed from an undeveloped and bandit-infested region into an orderly and prosperous territory, and to-day because of that prosperity, coupled with the security afforded, Manchuria is attracting settlers from other parts of China at the rate of approximately one million a year.

Japan's interest in Manchuria differs from her interest in other parts of China, in that it is twofold, economic and political. Her economic interest began immediately after her war with Russia, when she received from Russia the lease of Kwantung (Port Arthur and Dalny) and the South Manchurian Railway with the approval of China. To-day in Manchuria, Japan possesses 700 miles of railways which form part of the trunk lines connecting Europe and Asia, and are run with an efficiency and regularity that can compare with the railway system of any other country; the Fushun mines rank among the most important coal producing areas in the world; and the port of Dairen (or Dalny) the southern terminus of the South Manchurian Railway, which when the Russo-Japanese war was ended was quite a small town, has to-day a population of 300,000, and among Chinese Treaty Ports ranks next to Shanghai in respect to volume of trade. Japan's investments in Manchuria are now valued at £200,000,000, while the number of Japanese subjects residing there is 1,200,000, including one million Koreans. I have perhaps said enough to show you the paramount importance of Manchuria to Japan from the economic point of view.

Politically, Manchuria is the key to the security of Japan, and to the peace and stability of the Far East. As the keystone of the defensive policy of Japan, strategically and politically, Manchuria, as some observers have pointed out, is of even greater importance to her than it is to China. Let history explain this. After the Sino-Japanese war of 1894-1895, the Liaotung Peninsula was ceded to Japan, who, owing to the intervention of three Powers was forced to return it to China. No sooner was this done than Tsarist Russia concluded a treaty of alliance with China whereby, in the event of war between Russia and Japan, China undertook to place at Russia's disposal all ports and other means of defence in Manchuria and granted to Russia a concession for the construction and operation of a railway line through that region. This was in 1896. Two years after—that is, in 1898—Russia concluded a treaty with China by which she secured the lease of Port Arthur and Dalny. Later, during the Boxer troubles of 1900, and despite the fact

that Manchuria itself was not involved, Russia occupied the whole region, and refused to listen to protests against her encroachments from foreign countries. China was entirely at Russia's mercy, and Manchuria was practically given up to her.

The strength of the position acquired by Russia in Manchuria and her menace to Japan at length compelled the latter to fight the war of 1904-1905. She fought not for conquest, and not because she was economically interested in Manchuria—in fact, at that time she had neither residents nor trade interests there to speak of—but because she realized that with Manchuria in Russian hands, Korea would be the next to go, and a Russian occupation of Korea would have meant a dagger at Japan's heart.

Manchuria, therefore, was then, and is still, vital to Japan's security. This does not mean that Japan has territorial ambitions there, or that she has any intention of establishing a Protectorate. She desires that the territory shall remain under Chinese sovereignty, but she insists that peace and good order shall be preserved, so that both Chinese and foreigners, in strict conformity with the principle of the open door and of equal opportunity, may reside there in peace and prosecute their lawful occupations without interference or disturbance.

These are the principles that underlie the whole of Japan's policy in the Far East and inspire the role that she desires to play there. Geographically and politically, Japan occupies in the Far East a position similar to that of Great Britain in the West. Like Great Britain, in the West, Japan is the strong stabilising element in the East. It naturally follows that the main purpose of Japan's policy in the Far East, like that of Great Britain in the West, is the maintenance of peace and the ordered progress of mankind. Her fixed determination to persist in that purpose has been made plain to all the world in the Imperial Rescript of last month, when His Majesty the Emperor, on the occasion of his enthronement, declared:—

"It is Our resolve to endeavour to promote at home the education of Our people and their moral and material betterment so that there may be harmony and contentment among them and power and prosperity for the whole nation; and to cultivate abroad friendly relations with all nations, thus contributing to the maintenance of the world peace and the advancement of the welfare of humanity."

There are those who think that a stage has been reached in the life of Japan when she must decide whether she will throw in her lot with East or West.

The idea is manifestly one which pre-supposes antagonism, ultimately leading to conflict, between the two civilizations. It is comprehensible

only if one tolerates the fallacy of a "Yellow Peril." But such a belief is entirely too narrow in its conception and far too terrible in its potential consequences to merit any consideration by Japan, who, in her pursuit of the goal of enduring peace and the continuous advancement of mankind, aspires to serve as a link connecting and harmonizing the civilizations of the East and of the West. This aspiration, if it is to be realized, demands the sympathy and co-operation of those countries that hold the key to peace in the East—the United States of America and the British Empire, our oldest and surest friend and former ally.

This brings me to the subject of Anglo-Japanese relations and I cannot let this opportunity pass without referring to the pleasure and gratification with which the sentiments expressed by His Majesty the King and Mr. Baldwin at the time of the Emperor's enthronement, have been received in Japan.

As Mr. Baldwin said—in words which all my fellow-countrymen heartily endorse—

"Our friendship has been sealed by historic alliance and the spirit of that alliance still flourishes and is the strongest guarantee for peace in the Far East."

The Prime Minister's words, and their endorsement by the Japanese Government and the Japanese people, may serve to dispel a lingering suspicion, which might otherwise harden into a mistaken belief, that the Japanese resented the abrogation of the Alliance. Any such suspicion is very wide of the mark. When the question of abrogation was first mooted, Japan was prepared to continue, to modify or to end the alliance as circumstances should dictate, because we were well aware of the fact that after the Great War the outlook of the world had changed and that the question of peace was no longer one of a balance of power but one of wider international co-ordination. We were prepared to continue the alliance in so far as it might not be inconsistent with the Covenant of the League of Nations, and did not result in arousing any untoward suspicion in the outside world.

But, when the proposal took concrete form and it was suggested that some wider understanding was necessary in the interest of peace in the Pacific region, we recognized spontaneously, not only without any trace of resentment but with entire goodwill, that the alliance had outlived its purpose. We believed, and still believe, that the spirit of peace which had always animated the alliance should live on to animate and to render effective the wider understanding that replaced it as the guarantee of peace in the Far East.

And now, in conclusion, let me briefly recapitulate the most prominent factors in the life and policy of modern Japan.

Japan has a surplus population and sadly lacks raw materials,

Because of these two facts—and not in spite of them—Japan requires peace. Peace and goodwill from and towards the other nations of the world are essential to her programme of industrialization, the only programme that can enable her to work out her salvation. Notwithstanding distance, and notwithstanding differences of race and language, Japan's ideas and ideals in regard to international affairs are very similar to those of Western nations. She has adopted manhood suffrage and is now on the high road to democracy, she is deeply interested in the League of Nations; her people are of one mind on disarmament and she is an enthusiastic supporter of the Kellogg Pact. In short, Japan is moving in the same social, political, and economic orbit as the progressive nations of the West. She is no longer a nation apart.

DISCUSSION.

COLONEL F. S. G. PIGGOTT: May I add two remarks to Mr. Sadao Saburi's wonderful address? He mentioned that the spirit of the Alliance which existed between this country and Japan is still alive, and he quoted the remarks of our King, and of the Prime Minister. I feel it would be of interest to add that the system which was started in the very early days of the Alliance of sending British officers to Japan to be attached to the Japanese Army and of sending Japanese officers to England to be attached to the British Army exists to this day. It has never ceased, and the gradual growth of the body of officers on each side who know the other side's point of view has, I think, been of very valuable assistance in keeping the mutual knowledge of the two countries bright and the spirit of friendship and of the Alliance alive. (Hear, hear.) Secondly, Mr. Saburi prefaced his lecture by referring to the illness of our King, and stated that the Japanese nation anxiously awaited the publication of every bulletin. We know that that is so; and perhaps of all the different sections of the Japanese nation who anxiously await the publication of those bulletins there is none more solicitous than the Imperial Army, for the reason that His Majesty holds the rank of Marshal therein, being indeed the first and only foreign monarch ever to receive that high honour from the Emperor of Japan.

THE CHAIRMAN:

We rarely have an opportunity of hearing so authoritative a statement on the subject with which the lecture dealt by one in such a high position in regard to these great international matters. I am sure we have all listened with keen interest to the admirable lecture which has been given by Mr. Sadao Saburi. The history of Japan is wonderful when we remember that, as Mr. Saburi said, only about sixty years ago she emerged from practically the Middle Ages, and has now risen to the first rank among the nations of the world in modern civilization, in strength, in science and in all modern achievements. We are proud and happy to think, as has been stated by Colonel Piggott, that the spirit which prompted the Alliance between the Lecturer's great country and our great country still exists. When you have such unity of aim and unity of thought and spirit, treaties are not necessary. Alliances exist in spirit and not on paper, and it is only the spirit of an Alliance that is of any value. I am sure that, as the years go on, unity of thought, and a determination to work not only in our own interests, but for the interests of mankind at large, will bind the two nations closer and closer together without any need of scraps of paper.

The customary votes of thanks to the Lecturer, Mr. Sadao Saburi, and to the Chairman, Viscount Allenby, were proposed and carried by acclamation.

STUDENT OF WAR: It may be so. And yet I think there is more in it. War is a game of skill and chance. Chance, or some unforeseen circumstance, may operate against one, and ruin the best laid plans. But in the long run chance should cancel out, and he who acts truly in accordance with correct principles should, I hold, prevail. Therefore I demand of my principles that they should show me the right course of action in every circumstance. I want to know that I shall not be in the wrong, and I want to know that I shall not be in the right.

THE PRINCIPLES OF WAR A DIALOGUE

BY REAR-ADMIRAL C. V. USBORNE, C.M.G.

ON STAGE: The Philosopher (alone). *Enter* Naval Student of War.

PHILOSOPHER: Ah! my boy, I am glad to see you. The pulses of age ever quicken at the sight of youth, and young brains seem to brighten old ones.

Refresh yourself with a glass of water and some of these excellent tabloids, and tell me how it fares with you?

STUDENT OF WAR: Thank you, my father; if I may call you so. It fares well with me—in fact my bodily health is excellent, and yet—

PHILOSOPHER: What "yet" can there be, since happiness and health are virtually synonymous?

STUDENT OF WAR: I am making a study of war, and though this is of absorbing interest, I confess to being sometimes a little puzzled; in fact I think I am suffering from mental indigestion.

PHILOSOPHER: Studying war! What an archaic occupation—there is no accounting for tastes! But why the indigestion?

STUDENT OF WAR: It comes, my father, from questions of theory. I am supplied by my professors with a set of Principles of War, and time after time I look to these principles for guidance as to my course of action in some strategical matter. But I cannot find the clear guidance so ardently desired. Instead my experience is that after subsequent events have proved my actions right or wrong, principles can be quoted which I am shown to have followed if I am right, and to have flouted if I am wrong.

PHILOSOPHER: I see! Dawn illumines the clear channel only after the ship has impaled herself upon the rocks?

STUDENT OF WAR: Exactly! Or to use another analogy—the barometer only falls when the storm is already upon us.

PHILOSOPHER: Is not your trouble merely that in life we can examine the past but cannot look into the future?

STUDENT OF WAR: It may be so. And yet I think there is more in it. War is a game of skill and chance. Chance, or some unforeseen circumstance may operate against one, and ruin the best laid plans. But in the long run chance should cancel out, and he who acts truly in accordance with correct principles should, I hold, prevail. Therefore, I demand of my principles that they should show me the right course of action in every circumstance. I cannot do more than take the right course, and I accept the fact that sometimes, even then, ill luck will bring me failure.

PHILOSOPHER: Your demand seems reasonable enough on the face of it, if indeed war be amenable to principles in any true sense. To borrow an instance from another branch of knowledge, take the "Principia." Newton's laws of motion can be relied on to forecast the motions of heavenly bodies. Or, again, the Mendelian principles foretell with accuracy the results of cross breeding—

STUDENT OF WAR: Precisely—but in war it is not so. The principles though they give you good hints certainly, are in the main a cat-'o-nine-tails wherewith to belabour the vanquished.

PHILOSOPHER: I gather then that you are not satisfied with your set of principles?

STUDENT OF WAR: Frankly I am not. Like olives, they stimulate my palate with a pleasant flavour, but leave my hunger unsatisfied.

PHILOSOPHER: Let me see, a principle may be either a fixed law or a settled rule of action. A fixed law when we are studying the results of causes beyond our control—a settled rule of action when we seek to know how to act in order to produce certain desired results.

STUDENT OF WAR: I hardly know which applies in our case; we study the past, and find that certain causes always produce the same results. We generalise these observations into laws. From these laws we try to develop rules to show what action to take to produce the results desired—at least—

PHILOSOPHER: My son, you grow prosy. Tell me then what are these principles: be they Laws or Rules?

STUDENT OF WAR: There are eight. They are—Maintenance of the Object; Offensive Action; Surprise; Concentration; Economy of—

PHILOSOPHER: Stop, stop! I thought we were talking of principles, that is, of laws or rules, but you have cited only abstract ideas.

STUDENT OF WAR: I beg your pardon, I don't quite follow you.

PHILOSOPHER: Why surely; both a law and a settled rule of action are definite statements, for example, take the second law of motion from

Newton's "Principia:" "Action and re-action are equal and opposite." Nothing, you see, could be more exact, and it is precisely its clear cut definition and its universal truth which constitutes it a principle. Again, in golf there is a rule of action, "Keep your eye on the ball," this may well be called a principle, for it is a rule of action which must invariably be fulfilled in order to succeed at golf.

But, "Maintenance of the Object"—"Surprise"! These are abstract ideas, they tell you nothing.

STUDENT OF WAR: I see. That is a new idea to me. I cannot deny that technically you are right; and yet each of these abstract ideas conveys to the mind a definite law, although the laws are not actually stated.

PHILOSOPHER: Houses are built brick upon brick, and conclusions follow step upon step, but each step must be stated, as each brick laid, before the next can be built thereon. Much must depend on the forming into words of the laws underlying your so-called principles. Until those statements are formulated it is idle to discuss their value.

STUDENT OF WAR: Let us try to formulate them.

PHILOSOPHER: By all means. But let us begin at the beginning, and first, since we are dealing with Principles of War and have already defined principles, I would ask you to tell me what is war?

STUDENT OF WAR: I know you live in a world apart, my father, but surely you know what war is?

PHILOSOPHER: Two cats fought on my roof last night. Tunney fought Dempsey a year ago. Were these acts war? I ask you again to define war?

STUDENT OF WAR: *Touche mon père!* I will try. War is a conflict between *nations* conducted by *men*, equipped with *weapons*, wherein each *antagonist* seeks to so *injure* the opposing *nation* that it will sue for peace for *fear* of further injury.

PHILOSOPHER: What a long definition, I would like it written down. Remember "brevity is the soul of wit."

STUDENT OF WAR: Here it is, my father. I will give you a tabloid for every word you can eliminate.

PHILOSOPHER (after consideration): Well, well, it seems I am to go hungry. Hunger was ever a philosophic dish. Stay, though, I would eliminate the words "for fear of" and substitute "to avoid," and thus earn one tabloid.

STUDENT OF WAR: Alas, my father, but "fear" must remain. Fear is of the essence of war, and I used the word in its real sense. If there

were no such thing it would be necessary to slaughter every man jack of the enemy before we could impose our will ; but fear saves their lives. When a few have been killed, starved or taken it is only necessary to convince the remainder that *they* would otherwise be killed, starved or taken, to cause them through fear to submit.

PHILOSOPHER : *Touche mon fils !* I give you "fear." I accept your definition, only noting that you have excluded fisticuffs, burglary, piracy, highway robbery, rioting, civil wars, and wars of extermination.

STUDENT OF WAR : Yes, I did so deliberately, meaning to confine the issue to modern wars between modern nations.

PHILOSOPHER : And I suppose that the principles we seek are expected not merely to assist you to make war, but to make war successfully.

STUDENT OF WAR : Of course. They must show us how to win.

PHILOSOPHER : But what if your enemy uses the same principles. Will they show him how to win also ?

STUDENT OF WAR : I had not thought of that. It seems a deadlock. Can you see the way out ?

PHILOSOPHER : I think so. The principles will show each of you what you must do to vanquish, but you may not have the means to put their precepts into effect.

STUDENT OF WAR : Ah ! yes. Very true. In such a case, I suppose, they will merely show you how you might have won had you had the means, and how to expire gracefully since you have not.

PHILOSOPHER : Say, rather, they will show you when there is no further hope of winning, and thus indicate the proper moment to sue for peace.

STUDENT OF WAR : That is cold comfort. I admit that if Germany had foreseen in 1915 that without doubt she must lose the war, she could have made a far better peace than she eventually did. But for us, defeat is unthinkable, not to be contemplated for one moment !

PHILOSOPHER : Then you must not go to war unless you have the means to win.

STUDENT OF WAR : But war may be forced upon us, we may be attacked.

PHILOSOPHER : In that case you must at once set about to provide the means to win against any power that may attack you.

STUDENT OF WAR : But what if the provision of such means is beyond our strength ?

PHILOSOPHER: Then it would be folly to make war. In such a case your statesmen must contrive to keep the peace, and should they fail your choice lies between surrender and a glorious gallop into national extermination.

STUDENT OF WAR: Let us drop that case, it is horrible, and consider that wherein to provide the *means* is within our power. Will any principle guide us as to this pre-war provision?

PHILOSOPHER: Surely the law is clear. "Be stronger than your possible enemies." "In every encounter the stronger force at the point of contact will prevail."

STUDENT OF WAR: That seems almost obvious, and yet is it true? Was England stronger than Spain when we vanquished the Spanish Armada? Was Nelson stronger than Villeneuve when he defeated the superior French and Spanish force at Trafalgar?

PHILOSOPHER: Assuredly yes, in both cases. In war and in battle the stronger opponent must always win. But do not mistake me: military strength lies not alone in numbers, but in a compound composed of efficiency of weapons, skill, courage and numbers.¹

STUDENT OF WAR: Then in order to estimate our strength we must know the relative value of these four requirements.

PHILOSOPHER: Remember—it is comparative strength we are after. If we have better weapons, more skill, greater courage and larger numbers, no further estimate is necessary; but if we do not excel at *all* points, then, as you truly point out, we must study the comparative values of the four elements, to help us to measure the strength of the compound.

STUDENT OF WAR: I do not suppose you will contest that to have a greater courage, that is a higher *morale* than your enemy, is the most important of the four components of strength?

PHILOSOPHER: Indeed, I fear I must contest it, for I myself believe that two brave and skilful men, armed with walking sticks are not the equal of one pusillanimous fellow armed with a revolver. And thus superior bravery, skill and numbers are outweighed and set at nought by superiority of weapons.

STUDENT OF WAR: It is certainly true that one modern cruiser could have made short work of the whole of the combined British, French and Spanish fleets at Trafalgar.

PHILOSOPHER: And that the English crossbows won the battle of Crécy against the flower of French chivalry.

¹ If we are estimating national strength, credit or national endurance must also be considered.

STUDENT OF WAR: And that a pair of machine guns would have prevented the landing of William the Conqueror.

PHILOSOPHER: So that we may say that superiority of weapons is immeasurably the most important of the four.

STUDENT OF WAR: I suppose on reflection I must grant you that, but next may we not put courage or *morale*?

PHILOSOPHER: Hardly. If we reflect on those battles at sea or on land wherein there was no great disparity in the weapon, it was skill which was the deciding factor.

STUDENT OF WAR: Now you mention it, I suppose this might be said of St. Vincent, The Nile and Trafalgar. In each case skill so utilised a numerically inferior force as to bring about a superior concentration, and thus won a victory. The same might be said of Hawke at Finisterre and of Rodney in the West Indies. In some of these battles, at any rate, the enemy *morale* was good.

PHILOSOPHER: Both courage and numbers must be useless without skill. Skill will often succeed against superior numbers and superior courage, even though it can do little against superior weapons.

STUDENT OF WAR: And next I suppose comes *morale*?

PHILOSOPHER: Yes, certainly, if you wish, for with superior weapons, skill and *morale*, much can be achieved even against superior numbers. Though indeed, having accorded to superiority of weapons the premier place, the order of merit of the remaining three matters not greatly, I think. If this idea of military strength could be represented mathematically, one might put it that one's strength is ascertained by multiplying together the four factors—weapons, skill, numbers, *morale*. Of these "weapons" will always be the largest factor, thus having the greatest effect on the product, but if any one of them be a zero or approaches zero, then the product also will be zero or nearly zero.

STUDENT OF WAR: I see your idea, and rather like your mathematical analogy. The pre-eminent desirability of being superior in the power of your weapons is not in fact greatly emphasized in the works I have read. Its truth I cannot gainsay, for after all, what are numbers without courage; what are courageous numbers without skill to use their weapons; what can avail courageous numbers skilfully handling their weapons, if these in fact are out of date as compared with the enemy's?

Can you not formulate what you have just said as a principle to qualify your first?

PHILOSOPHER: Let us try. Strength is a product of weapon value, skill, *morale* and numbers, and of these weapon value is by far the most important factor.

STUDENT OF WAR: It occurs to me that so often antagonists are similarly armed, and that may explain why we hear so little of weapon value?

PHILOSOPHER: In history, I fancy, dissimilarity occurs as often as similarity. Nevertheless, you may not be able to achieve weapon superiority, and in that case, the other factors will loom large; but if in your preparations you neglect to improve your weapons with all your resources, you will assuredly find yourself in the unenviable position of weapon inferiority.

STUDENT OF WAR: With us experimental development goes on unceasingly.

PHILOSOPHER: I am sure of it, for the truth of my principle is instinctively recognised, although it has not apparently been thought worth while to state it.

STUDENT OF WAR: Well, my father, to be stronger, and to know wherein strength lies, that much you have taught me, but what next?

PHILOSOPHER: I should say that we must now consider the manner of using our strength. May I look once more at your definition of war? Let me see . . .

We are so to injure the opposing nation that for fear of further injury it will sue for peace. Is that not so?

STUDENT OF WAR: It is.

PHILOSOPHER: And will he not do the same to us?

STUDENT OF WAR: Undoubtedly, but we must hold him with our defence whilst injuring him with our attack.

PHILOSOPHER: Then surely much will depend on the proportion of our strength we allot to defence and to attack.

STUDENT OF WAR: Ah! there emerges our principle of Economy of Force, which tells us to be economical in defence in order to have maximum strength available for attack.

PHILOSOPHER: Precisely, thus compelling the enemy to use maximum strength in defence. But suppose the enemy, having got wind of this principle, attacks first, it is we who will find ourselves using maximum strength in defence.

STUDENT OF WAR: No, excuse me, the principle enjoins that whatever the enemy's scale of attack, just enough strength and no more shall be allocated for defence.

PHILOSOPHER: I could not have stated it better, but it appears to me that it requires re-inforcing by that idea of attacking first. For if already you are strong in attacking force and niggardly in defence, your

strong attack, if it fall before the enemy's, will force him to draw strength from his pending attack to reinforce his defence.

STUDENT OF WAR: I am sorry to disappoint you again, my father, but this has already been thought of, and is embodied in the principle of Offensive Action.

PHILOSOPHER: Ha! is not "offensive action" synonymous with "attack" and is it not that same which injures the enemy as required by your definition of war.

STUDENT OF WAR: Yes, that is so.

PHILOSOPHER: Then offensive action has a double merit; firstly, it injures, secondly, it reduces the enemy's scale of attack.

STUDENT OF WAR: Certainly, I agree.

PHILOSOPHER: Then these two points must be brought out in formulating the principle?

STUDENT OF WAR: I have often heard it said that offensive action is the forerunner of victory.

PHILOSOPHER: Loose—very loose. And yet it contains a great idea. Without offensive action you cannot injure the enemy! Another point to embody.

STUDENT OF WAR: Body away then, my father, it is beyond me.

PHILOSOPHER: To injure the enemy it is necessary to take offensive action. Such action, if taken first, has the further effect of weakening the enemy's attack, thus liberating strength from the defence.

STUDENT OF WAR: I cannot find fault with that, dogmatic though it sounds. What now? Perhaps you are tired?

PHILOSOPHER: On the contrary, I am just beginning to understand the lust of battle and the joy of war. We have established that to win, the enemy must be reduced to such a state of fear that he sues for peace. That, whether the enemy knows it or not, we are in real fact and very truth stronger than he.

That we set about to injure him without loss of time, using for this purpose the whole of our strength, except a bare minimum sufficient to beat off his attempts to injure us.

It would seem that what we want now is to study the nature of the injury we would wish to inflict and relate it to that which is within our power.

It is I suppose impracticable to hold a dagger to the breast of every enemy citizen and shout hoarsely in his ear "surrender or die," for if it could be done it would settle the war in five minutes, but tell me what injuries are practicable?

STUDENT OF WAR: We seek to destroy his armed forces on land, for these alone come between us and his civil population. We seek to destroy his armed forces at sea for these alone come between us and a total stoppage of his sea communications. By air we may go behind his armed forces and destroy his factories, and dislocate his internal organisation.

By diverse means we destroy his trade, break down his credit, bring fear into his heart and hunger into his belly.

PHILOSOPHER: I see the means are many and doubtless they change as time goes on. They cannot therefore be reduced to principles, for these must be permanent. Yet the degree of our offensive operations still requires to be considered. Tell me, then, can we by one single gigantic operation strike the enemy down and make him sue for peace.

STUDENT OF WAR: I fear the answer must be "No," for there is no war that I can think of where one operation has brought it to a close.

PHILOSOPHER: Ah! then, in that case it will be necessary to progress by a series of steps, each opening the way to the next.

STUDENT OF WAR: Yes, I suppose so. In practice there are often a number of operations going on at the same time. For example, the army may be attacking his army. The navy may be blockading him. An expedition may be making war on his colonies, and so on.

PHILOSOPHER: But surely, all these operations are absolutely co-ordinated. Assure me, I beg you, that none would be so egregious as to dissipate his strength on a minor expedition against a colony, such as you mention, unless such expedition re-acted very definitely in favour of the main operation?

STUDENT OF WAR: I cannot give you that assurance, my father, yet I perceive that you are right. Strength must not be wasted on minor operations, which do not re-act on the main blow we are in process of striking.

PHILOSOPHER: Shall we say then—Simultaneous operations may only be undertaken in co-operation for a definite object?

STUDENT OF WAR: I agree, but we have not yet arrived at the degree of an individual offensive operation, in fact, how much can we bite off at a time?

PHILOSOPHER: Agreeable though war doubtless is to your blood-thirsty spirit, may I presume that it is in the national interest to get it over as quickly as possible?

STUDENT OF WAR: Certainly you may.

PHILOSOPHER: Then the answer to your question is clear, my son.

STUDENT OF WAR : Answer it then, oh my father of rare penetration!

PHILOSOPHER : The object you must choose is the infliction of the greatest degree of injury within your power to encompass in a single operation. To this you must tenaciously adhere until it is achieved, unless new circumstances render it no longer possible or no longer desirable.

STUDENT OF WAR : This resembles the principle of Maintenance of the Object, which implies that the object must be decided on and held clearly in view.

PHILOSOPHER : Yes, but *our* principle not only exhorts you to have an object and to adhere to it, but indicates in addition, what that object should be, and in what circumstances it should be adhered to and in what relinquished.

STUDENT OF WAR : You do not mention the time necessary for its achievement in the factors governing the selection of the object.

PHILOSOPHER : No, for a permissible operation, being something within your power to achieve, must be one of which you can foresee the end. It is not a question of the days and hours involved, but of how far you can look into the results of your actions. I am glad, however, that you mentioned time, for suddenness must be a very potent factor in all operations.

STUDENT OF WAR : Surprise we call it, a most effective and powerful weapon in war, as is often said.

PHILOSOPHER : That must be true, for a surprise operation or one of an unexpected nature must force an enemy to improvise a new defence. It must throw him into confusion and strike fear and blindness into the very heart of his being.

STUDENT OF WAR : How then would you formulate the principle?

PHILOSOPHER : I would go so far as to say "Embody surprise in the plan of every operation."

STUDENT OF WAR : It seems, then, that if we apply your principles we have the enemy well beaten ; and yet in war the unexpected so often happens, and where then are our carefully planned operations ? Are there no principles which will guide us when we ourselves are surprised, or when things, through something unforeseen, do not turn out as we expect ?

PHILOSOPHER : Vision to comprehend a new situation, decision to act upon it, flexibility to conform to the new decision. All these may be termed mobility ; it might be said that superior mobility, partaking as it does of superior skill and superior weapons and being thus a component of greater strength, should already be on our side. It is useful,

however, to consider it as a separate idea, and we may thus say: "To have mobility superior to the enemy's gives power to deal with the unexpected and to inflict it."

STUDENT OF WAR: You have defined the principle of mobility, and I think now we have covered all the classic principles as well as adding a few of our own.

PHILOSOPHER: Let us then garner them up and see where we have arrived.

STUDENT OF WAR: Please go on; I am all attention.

PHILOSOPHER: We must draw our first, I think, from your definition of war, thus:—

Principle No. I.—"A war is won by so injuring the enemy nation that it will sue for peace for fear of further injury."

This tells us how to make war and leads to—

Principle No. II.—"Be stronger than your enemy. In every encounter the stronger force at the point of contact will prevail."

This requires us to define strength lest this be misunderstood and gives us—

Principle No. III.—"Strength is a product of weapon value, skill, morale and numbers; and of these, weapon value is the greatest factor."

Now we are ready to see how to use our superior strength, and we have—

Principle No. IV.—"Just enough strength must be allocated to defence, to resist the enemy's attack"; and this, of course, requires illuminating by the next, which is—

Principle No. V.—"To injure the enemy it is necessary to take offensive action. Such action if taken first has the further effect of weakening the enemy's attack, thus liberating strength from the defence."

In deciding on what offensive action to take, the successful belligerent will require to remember the next two, namely—

Principle No. VI.—"The belligerent must choose as his object the infliction of the greatest degree of injury within his power to encompass in a single operation. To this object he must adhere tenaciously until it is achieved, unless new circumstances render it no longer possible or no longer desirable."

Further light is thrown on this by—

Principle No. VII.—"Simultaneous operations may only be undertaken in co-operation for a definite object."

And thus we come to principles dealing with the manner of carrying out operations :—

Principle No. VIII.—"Embody surprise in the plan of every operation."

And again—

Principle No. IX.—"To possess mobility superior to the enemy's gives power to deal with the unexpected and to inflict it."

STUDENT OF WAR : Is that all ?

PHILOSOPHER : Yes, that is all. He who has these principles fulfilled on his side cannot lose in war.

STUDENT OF WAR : Have you no place for the principle of concentration ?

PHILOSOPHER : That is included in Principle No. II.

STUDENT OF WAR : — And security ?

PHILOSOPHER : That idea is provided for in Principle No. IV.

STUDENT OF WAR : Then it seems we are now equipped with the means of winning the next war.

PHILOSOPHER : No, far from it. But you are furnished with a guide to show you how to become equipped.

STUDENT OF WAR : Pray, how ?

PHILOSOPHER : By becoming stronger than your possible opponent.

STUDENT OF WAR : But how am I to know whether I am stronger than my opponent ? How reckon up the complex sum of weapon value and all the rest of it ? Your principles may be magnificent, but it seems impossible to apply them.

PHILOSOPHER : In reckoning your comparative strength one faculty alone will help you "Judgment."

STUDENT OF WAR : What do you mean by Judgment ?

PHILOSOPHER : The power correctly to appraise factors whose relative value cannot be computed mathematically.

STUDENT OF WAR : Is it not really the power to size up any two opponents and predict which will win in a fight ?

PHILOSOPHER : Yes, I suppose it amounts to that.

STUDENT OF WAR : How then, can I acquire this priceless quality ?

PHILOSOPHER : Collect information. Develop observation. Cultivate imagination.

Thus, knowing all the factors as they concern your enemy and yourself, and missing no point in the game, you will correctly foresee the results of possible encounters, and will know how to act.

STUDENT OF WAR: And if by hard work and determination I acquire these qualities, am I at length equipped?

PHILOSOPHER: No, you still lack one thing—perhaps the most vital of all for a fighter.

STUDENT OF WAR: Heavens, there seems no end to it, what more must I have?

PHILOSOPHER: Resolution!

STUDENT OF WAR: I wonder if I possess this quality.

PHILOSOPHER: You have it if you believe you have it!

STUDENT OF WAR: I do believe, and now I must get to work.

PHILOSOPHER: Fare you well then on your sanguinary road to the stars!

STUDENT OF WAR: And fare you well, on your contemplative journey to the infinite.

THE SELF-DEFENCE OF THE INFANTRY BATTALION AGAINST ARMOURED FIGHTING VEHICLES

BY CAPTAIN H. W. MIREHOUSE, M.B.E., *p.s.c.*,
The Prince of Wales's Volunteers.

INTRODUCTION.

The author has based his arguments on :—

- (1) The existing War Establishment of an infantry battalion, and not on any radical mechanized modifications which may take place later ;
- (2) The assumption that the most likely forms of mechanized attack are those of medium and light tanks (especially the latter), cross country and other armoured cars. He has ignored the heavy (battle) tank, since he holds that in most cases where this may be encountered, the battalion is certain to be assisted in its defence by other arms.

ON THE NATURE OF THE ATTACK.

The methods adopted by Armoured Fighting Vehicles against an infantry battalion may range from attack by several against one part of the battalion area to simultaneous attacks against different portions. Now, in combating such attacks, infantry should bear in mind three attributes of these vehicles :—

- (a) Their concentrated fire power and ever present threat of shock action ;
- (b) Their relative mobility and invulnerability ;
- (c) Arising from the above, the fact that the adversary will not merely endeavour to effect surprise, but is particularly well placed to secure it.

To counter these, the three most important factors affecting infantry defence, would seem to be, in order of importance :—(1) Weapons ; (2) Ground ; (3) Information.

To consider these in detail, the ideal is that every armed man should possess a weapon which would be effective against any and every form of opposition. From this follows the postulate that every formation,

or better, every unit, should be capable if not of attack, at any rate of self-defence, against any adversary.

(1) *Weapons*.—Of these three factors, weapons are necessarily the most important, since if every soldier carried an anti-tank gun, the chances, at any time and over any ground, of successful tank attack on an infantry battalion in position would be small.

But our provisional establishment is four anti-tank guns per battalion. Is this enough? Further, it is unfortunate that the present type should only be suitable for A.T. use, and not for close support or anti-aircraft work. Hence it follows that the A.T. equipment, and personnel as such, are only of value against an enemy possessing A.F.Vs and then only at such times as these latter are in use. This is a platitude apt to be forgotten but of importance in considering the problem.

Let us now take the case of a battalion threatened by A.F.Vs, and assume that in attack or defence it covers an area approximately 1,000 yards square in dead flat country. Let us also assume that the effective range of our A.T. gun is some 800 yards. As the country is open, the four A.T. guns have clear fields of fire, and the theoretical diagram "A" shows that no part of the battalion area is covered by less than two guns, that about two-thirds is covered by three and the central quarter by all four. Furthermore, no A.F.V. can approach within 350 yards of the area without being engaged by at least one gun.¹

This is excellent. Our A.T. guns are not unduly conspicuous and can be camouflaged, in defence they can be dug in, and will require a good deal of knocking out, particularly from a moving platform. In addition, with 16 M.Gs. and 24 L.Gs. available, they can be protected against assault or neutralization at close quarters by infantry.

Unfortunately, from the A.T. gunnery point of view, country which affords all round fields of fire to this extent is rarely found on a modern battlefield. We are thus brought to our second factor.

(2) *Ground*.—This may be considered from two aspects, pro-tank and anti-tank.

The most favourable ground for attacks by A.F.Vs on infantry not merely offers no physical obstacles to mechanized movement, but prevents effective individual or combined use of A.T. weapons. Conversely, the most favourable anti-tank ground is that which prohibits the use of A.F.Vs entirely, and so renders A.T. weapons for the time unnecessary. This approaches dangerously near the first platitude, still, what applies

¹ If the guns are sited as in A1, the minimum range of engagement becomes 50 per cent. greater, but the density of fire 50 per cent. less, and mutual support vanishes.

to ground applies equally to time, and the two factors combined afford a series of combinations ranging from certain immunity to a certainty of attack.

In theatres permitting the employment of A.F.Vs, as a general rule, ground features are more likely to hinder than assist the local A.T. protection of a battalion area. Moreover, owing to difficulties of siting and to the existence of covered lines of approach, it is often hardly adequate to build up a small arms fire plan to cover a battalion front, whilst permitting of a degree of depth : this with 16 M.Gs., 24 L.Gs. and the rifle power available.

In most cases it will be found impossible so to site four A.T. guns that they protect, by their fire alone, the whole of the battalion area from attack, which may come from any or all of the four points of the compass. To some extent artificial obstructions and minefields may be utilized to accentuate the anti-tank features of the ground, or to remedy its deficiencies in this respect.

The great objection to these defensive methods is the time taken in their preparation if any extensive system is contemplated. A second disadvantage is the fact that they are essentially static, and cannot easily be transferred from one place to another, neither can they protect a battalion in movement, as for instance, a ship is protected by paravanes. On the other hand, such obstructions are often the most practical safeguard that can be adopted, and do assist to a considerable extent in making up for a deficiency in anti-tank weapons.

This being so, it is thought of interest to set down some of the main points affecting obstacles, both natural and artificial :—

- (a) If an alternative line of attack or a local detour exists, the obstacle may lose much of its value as such ;
- (b) An obstacle must always be watched and usually covered by fire ;
- (c) The defence of an obstacle must be so arranged that it is not itself overwhelmed or neutralized by the attacker. It should also be defiladed from other defensive fire ;
- (d) The greater the surprise effect of an obstacle, the more efficient it becomes. Hence concealment is important. Obviously an obstacle reconnoitred in detail by the enemy loses much of its effect. Where circumstances permit, obstacles should be sited in depth, or their position changed from time to time ;
- (e) Deception may be practised on occasions. This form of obstruction is, however, intrinsically of negative rather than

of positive value—in other words, the enemy may call the bluff and win the hand.

(3) *Information.*—"If an enemy is so closely watched that he can make no movement unknown to his opponents, surprise will be impossible" (F.S.R. II, 43(3))—

It is not as a rule the duty of a battalion commander to embark on strategic reconnaissance, it is always his duty to ensure that he has sufficient warning of attack. The earlier touch can be secured with the opponent, the earlier can he obtain this information.

Now, the present means of reconnaissance at the disposal of a battalion commander are archaic. The infantry scout or runner on foot has often proved not only the least vulnerable but the most valuable in wars when the "Queen of the Battlefield" was the foot-soldier. But in these days of revolutionary military thought, alas, the supreme position of infantry has been usurped, and from the wording of F.S.R. 13 (i) it would appear that strong communistic tendencies exist. It is even said by the extremists that the machine is mightier than its creator, man.

Be this as it may, we really must admit that personnel entrusted with duties of reconnaissance and intercommunication should be more mobile than the arm they serve. Preferably, they should be more mobile than the arm in opposition, although this is often impossible. This mobility, as far as infantry is concerned, can be brought about in two ways, both of which are in every day use in the service :—

(a) The horse is still the most practical one-man cross-country carrier. With the exception of officers, no reconnaissance or intercommunication personnel is mounted in the British infantry. The French have their mounted "agents de liaison," and it is understood that the Germans advocate the same policy. By all means let our infantry transport be mechanized, but until a "Baby Austin" or one-man tank wins the Grand National, don't mechanize our riding horses. Give us more.

(b) Turning to mechanical means, which in some respects are more suitable than the horse, we have our 21 bicycles. The characteristics of this vehicle have been described by many—in song, in print and in other ways. It is quite unsuitable for rapid intercommunication or distant reconnaissance, whatever its other merits may be. The motor-cycle, on the other hand, is now so reliable, that it is considered that it should replace the obsolescent pedal cycle, especially when in the hands of an experienced rider it has a far superior cross country performance.

Given extra horses and motor cycles, with scouts and messengers trained in their handling, a battalion commander would feel far more confident as to the security of his unit against sudden attack, as well as being more favourably placed as regards control.

THE SOLUTION OF THE PROBLEM.

The answer to the attack seems to lie along the following lines, most of which have already been referred to. Consequently we need do no more than to summarize them :—

- (a) An increase in the number of A.T. weapons allotted to the battalion.

Apart from the fact that the present establishment is itself provisional and experimental, two objections arise :

- (i) Owing to financial restriction, increased expenditure on any one branch of the Service must entail a corresponding decrease elsewhere. It was stated recently in Parliament that we lead the world in tank equipment. If this is so, is it not better to devote the funds available to maintaining this superiority, rather than in diverting too large a proportion to the anti-tank defence of one particular arm ?
- (ii) An increase in the numbers of a weapon, utilizable only as a machine killer in certain circumstances, at the expense of other weapons of more general utility, e.g., close support guns.

- (b) An increase in the mobility of the A.T. weapon.

In course of time, this will no doubt come about, but at present it is probable that mobility could only be increased by sacrificing simplicity, inconspicuousness and possibly striking power. The present limitations of the weapon do not, of course, in any way preclude the provision of alternative positions, or the keeping of certain guns at times "on wheels" in central positions of readiness.

- (c) The utilization of existing small arms against A.F.Vs.

Whilst ineffective against heavily armoured tanks, this defence is not necessarily so against armoured cars or lightly armoured vehicles, more especially where increased velocity is possible or where incendiary or armour piercing ammunition is employed. It may here be mentioned that the provisions of the St. Petersburg and Hague Declarations were presumably intended to apply to the use of such projectiles against men not against machines.

Other considerations apart, the opening of such fire may assist in maintaining *morale*.

- (d) The choice of ground itself hindering the enemy's use of A.F.Vs and the adoption of practicable measures (e.g., road blocks, A.T. mine fields) further to restrict their activities.
- (e) The provision in open warfare, or when isolated, of as distant reconnaissance as is warranted by the circumstances, always bearing in mind the possibilities of attack from other directions than the immediate front, particularly where armoured cars are concerned. This to be accompanied within the battalion by previously rehearsed alarm precautions coupled with the most efficient means of intercommunication.
- (f) The exposure of as few men as possible to attack in the open.

Although this may be made a general rule in defence, it is, in many cases, a counsel of perfection. A counter attack by A.F.Vs on assaulting infantry is certain to catch considerable numbers away from defensible positions or tank proof localities.

In short, as usually happens in cases where variable conditions occur, a compromise between the ideal and the practicable must be effected.

FACTORS AFFECTING ORGANIZATION.

Any suggestion affecting organization should be reviewed in the light of the policy laid down in F.S.R. I(3). The circumstances affecting any increase in (i), the number of A.T. guns, and (ii), the provision of more mobile means of reconnaissance and intercommunication, will now be examined :—

- (i) Opposition by A.F.Vs is to be expected in future major wars, but it will be exceptional in minor operations or frontier warfare.

The flaw in our present equipment has already been referred to; the weapon itself is suited only to exceptional rather than to average conditions. Hence an all round increase in this particular type would be a fundamental error. When a dual purpose weapon—close support and A.T. gun—is available, the matter will assume a different aspect. This, however, does not solve the immediate problem, the better defence of units exposed to attack.

From an individual and collective point of view it is very necessary that training in an A.T. weapon should be universal. It is unnecessary that the same scale of equipment should be

universal, in fact it is preferable for experimental reasons, as well as from considerations of ground and varying likelihood of attack already referred to, that this should not be so. This leads to an argument involving the pros and cons of organizing the additional personnel and weapons as Divisional or Army Troops, an argument which it is not proposed to pursue. Should the reader be prepared to do so, it seems as well to bear in mind the maxim that the best defence against the tank is another tank, and not to overlook the objection already mentioned.

- (ii) The second suggestion, on the other hand, does not appear to be open to the objection that it is suited only to exceptional conditions.

It is true that we now have a cavalry regiment, and over a hundred motor cyclists in an infantry division. Since, however, specific roles have been already allotted to these, they cannot meet the local needs of the infantry battalions, and are unlikely ever to be decentralized for this purpose. But the gradual mechanization of infantry transport will set free personnel trained to some extent in animal management. The substitution of, say, nine riding for light draught horses should present no insuperable difficulties, neither should the addition of some nine motor cycles to the M.T. equipment.

The expense, moreover, would be small compared with the benefits to be obtained. In exceptional circumstances, e.g., mountain warfare, the personnel can revert to foot duties, or be withdrawn to Brigade or Divisional control. Their initial training can be carried out by attachment to such units as a cavalry regiment or an armoured car company, if it is felt that their own arm does not afford the required facilities.

In conclusion, if the infantry soldier at the present time is satisfied with his chances against mechanized attack, no such measures as advocated are necessary. The writer, however, maintains that an infantry battalion by itself is too often helpless against tanks, completely disorganized by armoured car attack, or immobilized by threat alone of such attack. If this view be endorsed, then surely the infantry soldier, and particularly the infantry officer, should consider the problem seriously, and put forward suggestions for remedying the existing state of affairs, for "*To do nothing is to do something definitely wrong.*"—I.T. 1(3).

NATIONAL FINANCE IN WAR

By JOHN MAYNARD KEYNES, Esq., C.B., M.A.

On Wednesday, 13th February, 1929, at 3 p.m.

COLONEL LORD AMPHILL, G.C.S.I., G.C.I.E., in the Chair.

THE CHAIRMAN introduced the Lecturer, drawing attention to his distinguished career, and in particular to his work at the Peace Conference of 1919; also to his experience in dealing with large financial problems.

LECTURE.

NOT even the prolegomena to the financial history of the late war have yet been written, and perhaps this history never will be written in any adequate way. Too many of the essential statistics were suppressed at the time and are still difficult or impossible to procure, while our memories of the magnitude of figures and the order of events are growing weak. To-day I wish to speak mainly of general principles, but I shall, inevitably, be speaking in the light of the events of the late war, and to a considerable degree with special reference to them. Looking back on them I am struck by the inadequacy of the theoretical views which, so far as I remember, we held at the time as to what was going on. I do not recall that anyone emphasised during the war what now seems to me the essential feature of the situation, a feature which I shall develop in a few moments.

THE IMPORTANCE OF CURRENT OUTPUT.

The first general principle which I would lay before you is that a country during a war must depend to a far greater degree than is commonly supposed on its current output. Delusions have always been common as to the relative degrees in which a country can depend on its accumulated wealth with which to wage war and on the current effort of its working population during the war. We spoke about mobilising the wealth of the country for the war. Now, if that meant the accumulated capital of the country I say that it was largely a delusion. There is very little of the capital wealth of a country which is capable of being used for war, perhaps fortunately. Countries cannot ruin themselves in war to the extent that they might be willing to, if they were able to, during its course. The wealth of this country, and of all countries, consists mainly of its houses, its railways, its roads, its cultivated fields, its drainage, its agriculture. None of these things can

be turned into munitions of war. The liquid stocks of materials which exist in the country at the outbreak of war are of trifling quantity in relation to its needs—perhaps not more than a few weeks' supply at the very outside. So that, putting on one side for the moment something which I will come to later, namely, the possibility of realising foreign investments, what is used during the war will have to be almost wholly produced during the war and produced in the country itself. So that the problem of war economy is to develop the greatest possible surplus of output over the current consumption of the country for other than war purposes. That is the problem in terms of real things, and one will never be clear about the financial part of it unless one has that clear first, and then considers and interprets the financial difficulties that arise in their relation to the real facts behind them.

I say that the problem is to develop the greatest possible surplus of the output of a country over its consumption for ordinary purposes. Now there is always a certain surplus which in ordinary peace times represents the savings of the country *plus* what it expends on replacement, that is to say, on making good the things which have worn out and on keeping buildings and other objects which deteriorate in good condition. In this surplus, namely, the normal savings of the country, we have resources which can be diverted at once to war purposes. On an occasion such as the late war, the amount which we could obtain in that way was, of course, hopelessly inadequate to meet requirements. It has to be expanded; and it can be expanded in two directions, first of all by more work being accomplished, i.e., by greater output, and on the other side, by diminishing consumption. The problem of war finance is a problem of how to secure that the general public should simultaneously put forward more effort and yet consume less; and the study of war finance is a study of the best devices—I might almost say, the best tricks—for securing this; and no financial device which does not either cause people to make more or to consume less is of the slightest use. One or other of those tests must be the criterion of whatever is put forward.

DIFFICULTIES TO THE PRODUCTION OF A SURPLUS.

Now there are three ways that offer themselves for securing this surplus—this difference between output and consumption, of which two are ordinarily considered as correct, orthodox finance, and the third as something highly undesirable. But—as I shall argue—it is the third which, on the occasion of great emergencies, is the only method which really presents itself as effective, and which, if properly used, may not be so very disadvantageous.

The orthodox methods prescribe that this surplus should be created partly by increased voluntary saving and partly by taxation; that is

to say, people should reduce their consumption partly by saving more than usual, partly by being prevented from spending by having some part of their income taken from them by taxes. Voluntary saving, that is to say voluntary reduction of consumption, is obviously excellent so far as it goes. But so very great a part of the current consumption of the country, particularly in war, is by the working classes, that you will certainly not secure sufficient reduction in consumption unless they save, and that is an extraordinarily difficult thing to bring about on an adequate scale. People who have fairly large incomes and can save without depriving themselves to any severe degree may be expected to save. But I do not think it has ever yet been found that any sufficient inducement can be offered, even in wartime, to the great mass of the population voluntarily to undergo privation in order that during the war they may save more. And even if the working classes do something in that direction, they are very unlikely to do enough. They will be earning more than usual. The efforts to increase output will lead to there being no unemployment and a great deal of overtime. If they receive the same rates of wages as before they will be enjoying larger incomes, and it will be extremely difficult to prevent them from spending some part, at any rate, of these increases. No country has found that voluntary saving is a thing on which it can depend.

Theorists have always recommended that that part which cannot be realised by voluntary saving must be raised by taxation. This again is a counsel of perfection, good in so far as it is practicable. But during a war one of the great objectives is to secure an immense amount of effort and output, and it is very difficult to devise a system of taxation which will not in some way or another be a deterrent to such activity. At a moment when you want everybody to be straining themselves to the utmost it is likely to be impolitic to introduce taxes which, however sound financially, will always be liable to exert some influence in the other direction.

WAR REVENUE BY TAXATION.

But I think there is an even stronger argument against supposing that you can cover the whole of the expenses by taxation, that is to say, taxation unassisted by any other devices—because my ultimate solution is a solution by taxation. It is, to a great extent, the current expenditure of the working classes which has to be curtailed, so that it means not merely a tax on the comparatively rich. Taxation of the comparatively rich will often be, during war, largely at the expense of what they would otherwise have saved. They will probably have curtailed their unnecessary expenditure, and you will only get by taxes what could have been got by voluntary saving. If you are to get enough, therefore, you will

have to tax the wages of the working classes. At a rough guess it would certainly have been necessary in the late war to have put a tax on wages of not less than 5/- in the £. It may be very good advice to tell a Government to do that, but does anyone see a Government in time of war landing itself in all the additional difficulties that a tax on wages would be bound to involve? Actually during the late war, in spite of our having exceptional opportunities of taxation during its later phases, of a kind which I shall discuss in a moment, we only raised something like one-sixth of the cost of the war by taxes. It does not seem to me serious politics to suggest that we could have kept the country together and carried on the war with taxation vastly heavier than it was. So that war finance will almost inevitably drive the Government and the Treasury back on some further expedient.

INFLATION.

The nature of this third expedient has been, I think, commonly somewhat misunderstood. The third expedient is the use of the instrument of inflation to bring about forced transferences from the consumer, partly to the Government and partly to the *entrepreneur*, who then becomes a suitable object of further taxation. It is the expedient which every Government at war has employed, and in the case of a serious war, one which every Government always will employ. When a Government orders munitions of war at a rate faster than that of current savings as supplemented by taxation—the inevitable effect of such measures must be to cause prices to rise faster than wages. The Government secures purchasing power for itself at the expense of the consumer, who is constantly finding that the real value of his income is less than he had supposed. By that means a transference of purchasing power takes place on precisely the scale which is required, in a way which it is impossible for the consumer to avoid, and without the various resistances which would inevitably take place against any form of forced saving or compulsory taxation.

Now, perhaps this sounds very shocking and unorthodox, but in my judgment it only is so if this process is not followed up by something further. What I have to say next is something to which I would particularly invite your attention. The transference which takes place when people find that their incomes are not able to buy as much as they expected, puts some resources directly into the hands of the Government. But to a very great extent the gains accrue in the first instance not to the Government, but to business men, who, owing to this rise of price, are able to sell what they have produced at an unexpectedly high price which yields them a profit in excess of what they had anticipated. The selling price of their goods is rising all the time faster than their cost of

production. That is to say, if this method of forced transference is adopted, the business men are made, in the first instance, the collectors—the agents, so to speak—for the Government, to collect the purchasing power which has been thus forcibly diverted from the consumers. It is after this diversion into the hands of the business men has taken place that there comes, in my judgment, the real divergence between sound finance and unsound finance. If you regard the business men not as agents, but as principals; if you regard them as entitled to these windfall profits, then you are embarking on essentially unsound finance. If you then borrow from the business man,—if you get the money from them in the shape of loans—you are allowing them to act as principals and to obtain a permanent claim against the public which they should never have had. But if, having allowed them to receive this additional sum, you then proceed to withdraw it from them through taxes, and in fact treat them as having been agents for the Government, then this device is far and away the most efficient that exists for collecting purchasing power from the consumers and transferring it into the hands of the Government.

TAXATION OF EXCESS PROFITS.

I think it is a great tribute to the practical cleverness of this country that by the end of the war this is almost precisely the scheme which we had succeeded in evolving. We allowed prices to rise faster than wages. We did not trouble too much about keeping prices and wages down, because we knew that it would almost certainly react on effort if we were to be fighting prices and wages all the time. There is a sentence in the new volume of Mr. Churchill's book in which he remarks that when he was Minister of Munitions nearly every manifestation of discontent on the part of munition workers had in the end been met by increases of wages, and that the motto of the Government was: "Let 'em have it, and let's get the stuff." "Let 'em have it and let's get the stuff" will inevitably be the motto of all departments in a hurry. But let 'em have it, and do not let 'em keep it; do not trouble too much about what is happening to prices and wages, but make certain that you secure by means of excess profits duties and other forms of direct taxation practically the whole of the excess profits which would otherwise accrue to the business man,—that is the secret of British war finance. It was not carried out with the same completeness in any other country. We found that while you can do something by voluntary saving and something by taxation, these would be inadequate by themselves. By taxation I mean taxation of the ordinary kind—as distinct from the taking away of excess profits by excess profits duties, etc. We then found that you could obtain this great surplus of output over consumption by constantly allowing the consumer's income to be worth less than he

had expected; and then securing for the Treasury the excess profits which thus accrued by means of specially contrived taxes.

In Germany they made the mistake of allowing the business man to keep too much of his profit and of then borrowing it from him. Other countries tried various other expedients. But I believe that the method which we pursued will necessarily be the method which will be employed in any war which involves really great expenses. The mistake which we made in this country was in not developing our method early enough—it was only in the last year of the war that the method of excess profits duty had been completed—and further in not completing the work done by the excess profits duty by means of a capital levy. There ought to have been a capital levy immediately after the end of the war, in 1919, by which the Treasury would have recovered the remaining amount which it had failed to get even by its most efficient excess profits duty. In that case business men would have been treated entirely as agents and not at all as principals, and you would have got the whole of the reduced consumption of the public inuring to the benefit of the State, which during war must be your ultimate objective.

OBJECTIONS TO TAXATION OF EXCESS PROFITS.

These methods, of course, have great practical objections to them and are often the seeds of great evils which will follow the conclusion of a war. But I am afraid that in any such event as the late war any Government which adhered to orthodox finance and refused the use of any of these expedients would inevitably find that the time factor was against them, and that they could not possibly succeed soon enough in securing the surplus required for the successful conduct of the war. If that is true it is useless to complain against the use of other methods, and one's object should be to perfect these other methods so that they lead to as little ill-consequence as may be. As soon as you realise that you must somehow reduce the value of people's incomes for the purposes of consumption; as soon as you realise that the whole object is to create this surplus and that somehow or other you have to prevent people from consuming as much as they would like, it becomes a matter of secondary importance precisely what device you adopt to bring about this reduction of consumption and the evil only arises if you allow a leakage—if you allow some part of the reduction of consumption of the patient public to inure to the benefit not of the State, but of the profiteer. So that my expedient for war finance would be to permit, in a sense, such an amount of profiteering as was required for extreme activity of output and then to devise technical methods for securing to the State the profits of the *entrepreneur*. As I say, during the war the Treasury and the Board of Inland Revenue in effect evolved precisely

this system, but they did it by methods of trial and error without fully realising in the earlier stages exactly what they were doing or exactly what the justification for it was.

SOURCES OF REVENUE ABROAD.

I have omitted so far one feature of war finance, namely, the possibility of raising resources abroad. That is a direction in which the accumulated wealth of a country has some importance. But here again, I think public opinion attaches too much importance to the relief that can be obtained from this source. In our case we were in a position of unexampled strength to benefit in that way, because we had a large volume of American securities which we sold to America and we realised a very substantial sum in that way. But even so, we were not in a position to realise substantial sums relatively to the cost of the war. If by such realizations and by borrowing abroad you could raise 10 per cent. of the cost of the war you would be very successful. This is necessarily, therefore, an expedient of secondary importance.

During the whole of the war this country borrowed in neutral countries a sum of about £42,000,000, or less than 1/200th part of the cost of the war. And it was not through not trying. I think I was myself responsible for drafting all the financial agreements that related to the raising of those loans, and the limitation of the possibilities was exceedingly plain. Further, it is an expedient only open to the State which at any given moment appears to be on the winning side. What was happening in the field used to make an extraordinary difference to the possibility of borrowing in neutral countries. During the early part of 1918, for example, the possibilities of such borrowing dried up almost completely. The whole tone of the negotiations was altered. But what we borrowed from America falls, of course, into a different category. That was on a very large scale and of enormous importance. But even including what we borrowed from America we only paid something like one-seventh of the expenses of the war out of foreign loans, of which the greater part came from the American Government and was offset by what we lent to our allies. We were, in fact, a conduit pipe for collecting foreign money and then distributing it to our allies. We lent to our allies during the war more than we borrowed abroad; so that so far as the war expenditure of this country was concerned, as distinct from the expenditure of our allies, we obtained no assistance from foreign borrowing. You may take it that practically the whole of our war effort came out of the current output of the country during the period of the war. This is a most extraordinary fact,—that that vast production of goods was achieved in addition to what was required to keep body and soul together during the period of the war. It shows, as compared with the

existing situation, what is possible in the way of the creation of wealth with whole-hearted organization, when everybody's efforts are directed to the production of the maximum quantity of material things.

When one looks back on the course of events one feels, as I have just said, that the high taxation of profits should have been started sooner and should have been rounded off at the end by a capital levy, but that, subject to that, it was true, what sometimes the Treasury was disposed to deny and what other people were inclined to affirm, namely, that at home there could be no financial problem in the proper sense of the word, provided the Government could secure the goods. The question of financing them was in the nature of a contrivance rather than a fundamental factor.

THE EXTERIOR FINANCIAL CRISIS, 1916-17.

But when you come to the foreign situation that is by no means the truth. Even though it were true that the purists took up too strict a view as to the home position, the spending departments were inclined to take up too lax a view as regards expenditure abroad. In my opinion, the rate at which this country was entering into foreign commitments in 1916, before the United States came into the war, was reckless in the extreme and might have involved us in exceedingly serious trouble if the United States had not come in,—which was something we were by no means banking on in the latter part of 1916. On the financial front there is no question that the worst point of the war was in the period between December, 1916, and the entry of America into the war in the Spring of 1917. Our power of meeting foreign payments at the end of 1916 had been almost exhausted. The history of those weeks has never yet been written, and the outside world by no means guessed the degree of our extremity. Indeed, now that so many war memoirs have been published, it is remarkable to discover that when the German Government were wondering whether unrestricted "U boat" warfare would be worth while, no one in the German Government seems to have raised the point: Is it not possible that the British Treasury are getting into deep water and that the only thing that can save them will be the entry of the United States into the war? That was a point which was not mentioned, so far as I know, in any of the revelations which have been made in regard to the counsels of the German Government at that time. If it had not been for the entry of the United States into the war, nothing is more certain than that we could not have continued, at the rate at which we were buying in 1916, either our purchases of munitions from abroad or the assistance which we were giving to our allies. That was partly the result of the greatly increased rate of expenditure during 1916. I feel, in looking back, that that was our outstanding point of

weakness; and the general principle which I should draw from it is this,—that whilst the home financial problem could be in a certain sense neglected, the foreign financial problem must always be one to which the most careful and meticulous calculations should be accorded from day to day.

THE FINANCING OF ALLIES.

There is another aspect of war finance which played a great part in the late war, although it may not play so great a part in other wars, and that was the question of financing our allies and the methods adopted—an exceedingly difficult question. I do not feel much clearer about it now than I did at the time. I was in charge of the department of the Treasury which was concerned particularly with the business of arranging the assistance given to the allies and of endeavouring to control it. First of all there was the political side to it. A certain amount of the financial support accorded to the allies was in order to secure and retain the support of those who, at any rate in the first instance or at the moment, might be dubious allies. But whilst a certain amount of assistance was given on political grounds, it was often exceedingly difficult to distinguish between the political aspect and the purely economic aspect. Thus, there is a tendency for what would be, on economic grounds, the right sort of control to be rejected on political grounds, and for no one to be very clear-headed as to where one begins and the other ends. Apart from that, every ally not unnaturally tries to put as much of the burden on the others as he can. Naturally, it is the object of every Treasury during war to save its own resources so far as it can, and, whenever there is a plausible case for it, to obtain all the assistance it is able to obtain from outside. That means that an exceedingly meticulous check on all expenditure has to be adopted. The method of lending to allies instead of subsidising them was, in my judgment, essentially in the nature of a device. It follows that the inter-allied debts are a very objectionable feature of the post-war settlement. But psychologically it was, during the war, necessary to finance the allies in that way, because it did to a certain extent diminish the strength of the motive to throw the greatest possible burden on to us. Much more important, however, was the necessity of Treasury control over allied expenditure—which raises very ticklish questions. In the early days of the war we would lend to a certain ally a certain number of millions of pounds and leave the spending of it to them. Then it used to happen that in a few months or a few weeks they would spend that money and come for more; to which we would reply: "You have spent it too soon, too quickly;" but there would be no means by that time of demonstrating whether it had been wisely or extravagantly

spent. Therefore in 1915-16, a system was gradually evolved by which all of the allies, with the exception of France, had to obtain British Treasury sanction for every single purchase of any magnitude which they were making abroad which was to be paid for out of British money, in order that we might test the wisdom of the expenditure day by day as it was incurred. That was an extraordinarily difficult thing to do with wisdom, but there would unquestionably have been an immense amount of waste if this method had not been adopted.

THE RELATIONS BETWEEN THE TREASURY AND THE SPENDING DEPARTMENTS.

That leads me to a general question which lies at the heart of national finance in war, and that is the right relation between the Treasury, as the controlling department, and the spending departments. So far as expenditure in this country was involved, the Treasury during the war recognised that the financial problem was secondary and Treasury control was practically suspended. But it was maintained necessarily and rightly, so far as related to expenditure outside this country and in the case of loans to our allies. That Treasury control could have been carried out much more efficiently, I think, if there had been a profounder understanding and sympathy between the Treasury and the spending departments, is manifest. I suppose it is inevitable in war that every department should exaggerate its own importance and believe that it, and it alone, is going to win the war, and that any attempt to diminish its rate of expenditure is to be regarded as cheese-paring. But if the spending departments could really understand that it is a choice between alternatives, and that anyone who misleads the Treasury as to the situation is causing the money to be spent in a wrong way instead of in a right way, a very much more efficient division of the national resources would be reached than was actually the case. There were many notorious instances of an analogous kind, when the shortage of shipping occurred. Many departments in their eagerness to obtain freight facilities would exaggerate their needs and possibly give misleading information as to stocks in order to get more than their share of the available shipping space. In the same way there would be a tendency to try and get more than their share of the available finance. That was a source of very great inefficiency—of less inefficiency, perhaps, in this country than in some others, yet I never felt that the right relations existed between the Treasury and the spending departments in this particular respect. If the spending departments had had a more profound understanding of the basic nature of war finance, a much higher degree of efficiency could have been obtained.

FINANCE AS A PREVENTIVE OF WAR.

I have been talking mainly about how finance can be made efficient for the purposes of war. I should like to conclude on a different note, namely, the possible efficiency of finance for the purpose of preventing war. A few days ago a report of the Finance Committee of the League of Nations was published which has obtained far less attention and publicity than it deserves. This Committee of the League of Nations has been working for some time on the question as to whether the financial power of the leading countries of the world could be employed as an instrument for the preservation of peace. They have now reached the point of putting forward certain provisional and tentative proposals. The essence of those proposals is that an arrangement should be made beforehand by which the leading Powers represented on the League should definitely agree, each taking its proper quota, that they would guarantee loans to the party in a dispute which the Council of the League decided was not the aggressor—that the whole thing should be cut and dried beforehand, so that the loans could be floated through the agency of the Financial Committees of the League with the least possible delay. For the prevention of war, particularly between Minor Powers, that seems to me to be a weapon of immense effect, because of the terrific importance which I have been stressing, of the external finances of a country during a period of hostilities. For a poor country which has no foreign investments and not much credit of its own, a country which has very inferior opportunities for manufacturing its own munitions, foreign finance is absolutely vital. Suppose the League of Nations was in a position to say that the injured party, or the party which was the injured party according to the decision of the League, should forthwith have financial assistance in the form of foreign currency up to, say, £50,000,000, that would be almost a decisive factor in keeping the peace among all minor nations. Take a case which might lead up to much more serious consequences—a war between two Minor Powers in the Balkans, I do not think the aggressor could stand up for a moment against a decision on the part of the League that financial assistance of that sort on that scale would be given instantly to the other party. It would practically settle the war before it had been begun. It is essential, however, for an arrangement of that kind that everything should be arranged beforehand—that all the Great Powers should be committed to follow the lead of the League in the matter so that there would be no avoidable delay. That, I understand, is the proposal of the Finance Committee. No country would have to support more than a reasonable burden. I feel it to be of the utmost importance that public attention should be concentrated on the possibilities of a development of this kind. It arms the League of Nations with a purely pacific instrument of a positive

kind. I agree that for the prevention of major wars between very great Powers other methods must be relied on. But the threat to the disturbance of the peace is much more likely to come in the first instance through troubles between Minor Powers than between Major Powers ; and in such cases I believe that the possibilities of the methods now suggested are by no means, as yet, fully appreciated.

DISCUSSION.

CAPTAIN SIR DAVID WILSON BARKER alluded to the economic advantages of a compulsory arrangement to ensure low wages in time of war. He remarked that as we conscripted men to fight, it should be possible to conscript men for every form of labour at home.

He asked whether he was to understand from the Lecturer that this country paid for the war out of its own resources, and if this were the case, how it came about that we owed so much to America, apart from advances to our Allies.

THE LECTURER, in replying, said that as regards the second question it was the case that the goods consumed during the war were produced during the war by the country out of its own resources. We had lent to the allies more than we had borrowed from America, so that we obtained no net benefit from our borrowing abroad ; in fact we handed the whole of it on, and a bit more too. He thought that the actual figures were of the order of £1,400,000,000 handed on, to £1,300,000,000 borrowed.

Replying to the first question, the Lecturer said : " The use of compulsory expedients to reduce wages is a subject well worth consideration. The objection to it is that it is exceedingly difficult to make it apply all round. The income of the country is obtained in various ways, some of them of a contractual character, and I think it would be both unjust and inexpedient to reduce wages unless you reduce all incomes to an equal extent. That involves the very difficult and technical problem of how to do it ; people will not understand it fully. I think that the proposal for the compulsory reduction of incomes is economically right and wise, but the question is, is it feasible on political and human grounds ? Somehow, I do not see any Government, with all the problems of a war on its shoulders, ever in practice adopting that solution, however wise it may admit it to be in quiet moments."

ADMIRAL SIR H. W. RICHMOND drew attention to the fact that both in the late war, and in all previous wars, we had to keep our allies on their feet and pay for their armies, either by subsidies or by loans, usually the former. We must therefore expect that under similar circumstances we shall again be called upon to be the financial strength of any allies with whom we may be engaged in fighting a common enemy. In consequence, we should try to increase output during a war and export as much as possible, while cutting down internal expenditure.

He wished to ask whether it was not a fact that internal debt mattered less than external debt ?

THE LECTURER said that he hoped in another war we should pick and choose our allies. He agreed that external and internal debts are of a totally different kind from one another. External debt affects the future wealth of the country as a whole, while internal debt is a matter of the distribution of income between one class and another.

COMMANDER V. H. DANCKWERTS, R.N. said that he understood that we had managed to pay America for all the raw material and other commodities which we bought from her during the war by expending a very large proportion of our foreign investments. He asked whether we were now in a position to discharge similar debts, should they arise within a measurable time, or whether we had so disbursed our resources that we could not do so until we had built up our external investments.

In regard to the possible intervention of the Financial Committee of the League of Nations, he asked whether it would not be essential for America to acquiesce and participate in the proposal if it were to be effective.

THE LECTURER, in replying, said: "We paid in the late war for our imports of raw materials partly from our current income, partly by our current exports, and partly by supplying munitions of war to our allies. We only paid our way inside this country if we reckon as exports what we handed to our allies in the way of munitions of war. We did just about balance, but it was a very precarious balance." He agreed that the external problem was a very serious one. With regard to the recovery in the aggregate of our foreign investments, it was calculated that their money value had now recovered to its pre-war figure, but owing to the fall in the value of money, their value in terms of things would be less than in pre-war days. Nevertheless, our financial position from that point of view was fairly strong.

He had no information as to whether the United States were consulted in regard to the report of the Financial Committee of the League; it was most desirable that they should be in it, but not essential. The countries already in the League were certainly good between them for a guarantee of £50,000,000. He thought that a mere threat of the kind would make it unnecessary for it to be used except on the rarest occasion, and as insurance it would be well worth while.

CAPTAIN E. ALTHAM suggested that the financial control exercised by the League of Nations would be very precarious if the nation designated as non-aggressor by the League were regarded as aggressor by the United States.

THE LECTURER, in reply, said that if the United States should give financial support to a country which the League had declared to be the aggressor, nothing was much good, and we would be in for a world war again; but he thought that was a situation which we might hope would not arise. He thought the contingency could only occur in the case of two minor powers which happened to belong to South America, in which case the responsibility for the maintenance of peace must rest primarily with the United States.

THE CHAIRMAN concluded by saying that the moral of the discussion was that a nation must be in a state of financial preparedness for war, just as she was in a state of military preparedness. We were taken completely unawares at the time of the Great War, and undoubtedly we made a number of serious mistakes. There had been gross extravagance and people had been made profiteers even against their will. The effect had been inflation of wages, in many cases beyond the dreams of avarice. He hoped that such mistakes would not be repeated, and that the principles enumerated by Mr. Keynes would be observed in the future.

The customary votes of thanks to the Lecturer and Chairman were put to the meeting and carried by acclamation.

INDUSTRIAL MOBILIZATION FOR WAR THE UNITED STATES SYSTEM¹

IN the days of Gustavus, Frederick, and Napoleon, warfare was a comparatively simple proposition, as military minds could then be concentrated entirely upon tactics, strategy, and the training of sufficient soldier personnel to defeat the enemy. Transportation facilities and communications were poor and armies subsisted on the fat of the land. Little or no attention was paid to the sinews of war, and military plans invariably assumed that munitions would be forthcoming in desired quantities when needed.

To-day, science and material are as important as human effort and man-power development. Inventions which enhanced the destructive power of man have been quickly adapted to warfare and, as the use of machinery increased, military equipment has become more and more complicated. Almost daily during the World War, one side or the other utilized some recent invention or discovery to increase their offensive power, until the result seemed to depend in a great measure upon which side could excel in the introduction of mechanical aids.

In the engineering profession, it is claimed that more instructional value is derived from a study of failures than of successes. With this as a basis, our World War experiences contain a large reservoir of instructional data. Our entry into that war, after years of existence under policies of unpreparedness, threw a tremendous additional burden upon industry. There was a lack of co-ordination between the various purchasing branches and departments of the government and the agents of the Allies which resulted in a tremendous inflation of prices, waste of effort, and confusion. It was quickly apparent that every resource of the nation must be utilized to the fullest extent. To bring order out of confusion, various control agencies were established. Of these, the War Industries Board was the most important and finally secured efficient output from American industry. According to Mr. Baruch, the chairman of this board, the great question during the World War was always "who could use the men, money, materials, and food to the quickest and best advantage in the winning of the war?" This board was the institution to which each could come with its various needs.

When the next war falls like a sledge hammer upon our economic structure, will we be fortunate enough to have accommodating allies to

¹ From an article, "Vital Role of Industrial Mobilization," by C. B. Robbins, Assistant Secretary of War, published in "The Military Engineer" of Washington, and reproduced by courtesy of that paper.

hold the bag for a year or two, pending the training and grooming of mass production? A review of America's effort in the war shows that, without Allied contribution of essential munitions, but little could have been accomplished during the first eighteen months. This demonstrated so clearly our inadequate state of defence against even small nations that Congress was led to undertake a revision of the National Defence Act of 1916. The Assistant Secretary of War is now charged by law with the :—

Supervision of the procurement of all military supplies and other business of the War Department pertaining thereto and the assurance of adequate provisions for the mobilization of material and industrial organizations essential to war time needs. . . . Under the direction of the Secretary of War, chiefs of branches of the Army charged with the procurement of supplies for the Army shall report direct to the Assistant Secretary of War regarding all matters of procurement. He shall cause to be manufactured or produced at the government owned factories of the United States, all such supplies or articles needed by the War Department, as said arsenals or government owned factories are capable of manufacturing or producing upon an economical basis. (National Defence Act, Section 5-a.)

We have heard and read many maxims of war bearing upon strategy and tactics. Military leaders and military writers have been prolific in their production. But it has been only since the World War that we find an insistence upon the recognition of the importance of industrial preparation. This recognition is now becoming universal. Both military and industrial leaders are emphatic in declaring that industrial preparation for war is absolutely essential for the adequate utilization of the available man-power. The dependence of the military effort upon industrial effort is, perhaps, nowhere more sharply emphasized than in a communication sent in 1924 from the French Cabinet to the Chamber of Deputies explaining the objects of a proposed law dealing with the general organization of the French nation in time of war.¹ The following paragraph is quoted from that communication :—

All the resources that industry, aided by science, puts at the disposition of modern society, will be utilized in the future either to strike the enemy or to protect one's self from his blows. Indispensable resources for a future war will be affected at two epochs : 1—During peace, continued and methodical experimentation on the most modern types of material ; assembly of the

¹ See "The Organization of the French Nation for War," R.U.S.I. JOURNAL, May, 1927.

indispensable stocks to equip and arm the military forces to be put into the line at the beginning of hostilities and to permit them to fight under foreseen conditions up to the time when industry can furnish the necessary complement; 2—At the proper moment, the automatic releasing of measures destined to assure mass production of armament, materials, articles of every kind necessary to the armed forces. Under penalty of grave danger, this production must be intensive, start methodically, and be closely co-ordinated.

Quotations of this kind might be multiplied indefinitely if desired.

As stated by Secretary Davis, "the problem of procuring munitions in a war involving a major defence calls for marshaling and directing all available resources of our farms, mines, forests and factories, also conserving power, labour and transportation so as to supply the fighting forces adequately with the least disturbance of our economic life." The better we prepare ourselves to accomplish this task in time of peace, the quicker can our troops deal effectively with the enemy.

The specific problem of the War Department is to tell industry what is wanted, where and when requirements must be met, and to arrange with whatever super-agencies may be created for the supply of raw materials, power, labour, machine tools, fuel, transportation and other essentials for production; in short, to see that each war contractor has his task clearly defined and is provided with every facility for its execution.

What must the Assistant Secretary do to carry out his statutory duties? First of all, he must know what articles of equipment and supply will be required. Tables of organization and equipment have been prepared under the direction of the General Staff, and types and standards for each item of that equipment have been fixed by the branch supplying it, the branch using it, the General Staff and the Assistant Secretary of War in co-operation. These tables furnish the basis for the determination of the initial supply requirements for each unit. The requirements for current expenditure, replacement, and maintenance are calculated by the aid of experience tables under varying conditions of service. Applying these tables to an assumed plan for the development of our maximum effort, each supply branch prepares quantitative lists of the articles which it is required to furnish under that plan. The lists thus prepared constitute the list of supplies with whose procurement the Assistant Secretary of War is charged.

In order to enable adequate plans to be made for the procurement of the vast quantity of supplies on this list, it is necessary to study the facilities which will be required: to calculate the requirements in

material ; to investigate the sources of the material and the rate of its production, and to devise methods of increasing that rate when necessary ; to consider what materials may not be available in the United States under war conditions and to discover suitable substitutes for such materials where practicable ; to determine what unavoidable deficiencies must inevitably occur in the rate of production, and to compile these deficiencies in order that reserves may be provided or that the plan may be modified. In addition, suitable personnel must be selected, trained, and organized for the efficient execution of the programme of production, and a study must be made of such additional laws as it may seem desirable to ask of the Congress when the emergency arises.

To supervise the preparation of procurement plans and to co-ordinate them, the Assistant Secretary has established in his office a Director of Procurement and a Planning Branch composed of officers detailed from the different supply branches of the Army. Although a few procurement plans have been prepared directly by the Planning Branch, such, as for instance, those for power, labour and transportation, it is a principle that has, in general, been constantly adhered to that the actual preparation of a plan for procurement is a function of that branch which is charged with the duty of that particular procurement, and that the primary function of the Assistant Secretary is to supervise and direct the supply branches in their planning work. These branches themselves make the contacts, collect the data, and prepare the plans.

The Assistant Secretary sees that the plans are in adequate detail, that they are in harmony with other procurement plans, and that the problems likely to arise in war are considered and properly solved. The goal toward which he is striving is to cause the supply branches to produce plans so completely developed that they may be able to discharge their duties in a major war without the need of any outside agency to co-ordinate and control their procurement activities, and without disrupting the industrial life of the nation as a whole or that of any community.

A war organization has been worked out in the Planning Branch which, it is believed, covers all the functions that might be involved in procurement control in a major emergency. In time of peace, there is assigned to each division and section of this organization, an officer of the Planning Branch, whose primary duty is to carry on a continuing functional study of the section and to initiate any measures that he believes should be taken by the Planning Branch, to prevent mistakes or to overcome such difficulties as were experienced in the World War, or such other difficulties as can be foreseen. The Planning Branch, directly under the Director of Procurement, consists at present of two

lieutenant-colonels, eight majors, and two captains, not counting the faculty of the Army Industrial College.

Co-operation with the Navy in industrial planning is obtained by means of the Army and Navy Munitions Board, composed primarily of the Assistant Secretary of War and the Assistant Secretary of the Navy, assisted by a number of committees formed of experienced Army and Navy officers to take cognizance of such important subjects as ordnance, aircraft, medical supplies, chemical warfare, communications, power plants and machinery, and marine construction.

The complete files of the Council of National Defence and of the sections of the War Industries Board were deposited with the Assistant Secretary of War in 1921. These files furnish a most important source of material for our studies of wartime procurement. In addition to these important papers, the branch has collected a small library for its own use and for the use of the Army Industrial College. It has easy access to the Library of Congress, to the library of the War College, and to the other important book collections in the city of Washington. From time to time, there are prepared for its use studies of the detailed organization of important industrial concerns, special emphasis being placed on their methods of planning and research activities. Many of the leading actors in the World War drama have illuminated the written record. Their recollections and their interpretations have been reduced to writing and have been added to the files.

In order to co-ordinate the work of the supply branches and to distribute the industrial load evenly on the country, the United States has been divided into fourteen procurement districts. Each supply branch is required to keep separate files for the several procurement districts so that, in case of war, a separate district office can be set up in each. During peace time, the branches are permitted to combine several districts, where convenient, under one district office. The personnel of the district offices is the agency by which contact is made between the planning organization and the individual industries. All procurement data secured under the supervision of the Assistant Secretary of War is kept on file in the supply branches for their use in time of war. The detailed organization of district offices is contained in branch unit plans.

As a preliminary to the preparation of plans for procuring any specific item of supply, specifications for that item are prepared by the branch responsible for it and checked by the Assistant Secretary of War. Plants and factories suitable for producing each item are "allocated" to each branch in accordance with its needs, and the items to be produced are apportioned by the supply branches to the districts and individual

producers so as to equalize the load with due regard to the necessities for power, labour, new facilities, transportation, fuel, and so on. As soon as plans have been made for the procurement of any item, the complete plan in the form of a specific procurement plan for that item is submitted by the chief of the supply branch for the approval of the Assistant Secretary of War. Thereafter, it is reviewed at stated intervals so as to keep it up-to-date and effective.

All the problems of procurement referred to above, including the preparation of specifications, specific procurement plans, computation of primary and secondary requirements, equitable distribution of the industrial war load, and such components as power, labour, and transportation, are studies within themselves, and no effort will be made to describe them in detail. The underlying policy which runs through all plans is to permit existing industrial organizations to operate spontaneously and to co-operate with minimum governmental restriction in their endeavour to supply urgent war needs. Power, transportation and other industries will not be taken over by the government unless absolute necessity exists therefore in order to assure production and the successful prosecution of the war.

Prior to the World War, all great nations relied entirely upon trained military men to formulate their war plans. Civilians, firms, factories, and corporations occupied reserved seats on the outside of the military barrier, and were kept in ignorance of their probable war-time duties. To-day, it is admitted as axiomatic that modern warfare is a complex business problem as well as a military one and, consequently, must be studied and planned in a businesslike way. So it has come to pass that industry is now recognized as a blood brother in the defensive family hitherto known as the Army and Navy.

It might be of interest, therefore, to know what business executives, industrial engineers, Reserve officers and other civilians not in uniform are doing to assist the government in formulating its plan to mobilize industry in event of emergency. First of all, the National Defence Act of 1920 is a composite of business and military viewpoints, since Congress, before passing this document, wisely received recommendations from war leaders of both classes. We draw upon the civilian world for knowledge of industry and industrial processes, national resources available to the country, existing transportation and power systems, latest developments in the arts and sciences, and many other things highly essential to our modern conception of national defence.

The Assistant Secretary's Office, the chiefs of branches, and all procurement districts are constantly in touch with civilian leaders. Direct co-operation has been secured from more than six hundred

civilians, many of whom are prominent in the engineering and business world. Besides these, contacts have been made with the managers and owners of more than ten thousand plants in the different industrial districts.

Procurement district officers have received invaluable assistance from the executives of industrial plants in making their surveys and their production plans. In numerous instances, these executives have had prepared at great expense complete plans for the prompt conversion and extension of their factories to the degree necessary to enable them rapidly to produce the supplies which would be required of them in war.

Much assistance is being rendered also by trade associations, technical societies and governmental agencies outside the War and Navy Departments. The National Electric Light Association is aiding materially in the power survey. The Association of Railway Executives has appointed regional advisers for the district chiefs. The Tanners' Council of the United States, Department of Agriculture and Bureau of Standards are aiding in the solution of the problem of tanning leather in time of war. Full co-operation on the part of the steel industry is most gratifying. The Department of Agriculture is also considering the subject of rubber cultivation in the Canal Zone and localities in the United States.

The American Institute of Mining and Metallurgical Engineers is doing a monumental work in the study of many important commodities, while the Bureau of Mines is likewise co-operating along these lines most effectively.

The alcohol industry, the National Defence Division of the American Society of Mechanical Engineers, the American Chemical Society, the United States Chamber of Commerce, the Society of American Military Engineers, and many other national societies and local organizations are rendering invaluable aid and patriotic service. It will be recalled that, during the war, the United States Chamber of Commerce lent its powerful support to the task of organizing the principal industries of the country in such a way that each could be represented by a war service committee. The Commodity Sections of the War Industries Board came in contact with industry through the medium of these committees.

Reserve officers in all parts of the country are doing constructive work and numerous letters containing valuable suggestions are being received from them.

Winter training courses such as "The Quartermaster Winter Plattsburg" afford unique opportunity for co-operation between the components of the Army organization and the civilian business world.

Army, as well as Navy, personnel are being trained annually at Harvard Business College, Babson Institute and the Army Industrial College, in order to be kept up-to-date in business procedure and made better qualified to fill key positions. Congress recently enacted a law amending the National Defence Act, extending to the enlisted personnel the privilege of detail to educational institutions for special training heretofore limited to officers. It is the hope of the Assistant Secretary to take advantage of this law to build up a Reserve officers' organization capable of performing duties in connection with war time procurement.

The Army Ordnance Association is a valuable medium through which civilians offer constructive work in promoting the cause of industrial preparedness, particularly in connection with the design, procurement, production, manufacture, inspection, test or supply of ordnance material. In several cities, such as New York, Chicago and San Francisco, all branch procurement district officers hold monthly meetings to which civilians, in addition to those on the procurement staff, are invited.

The above are but a few of the many examples which could be cited illustrating the wonderful co-operative spirit which now exists between our government and industry.

As far as progress is concerned, the war plan of the Assistant Secretary will never be completed, as all elements in it are subject to constant change and revision. Completed procurement plans have progressed rather slowly, but considerable headway has been made in the component parts of such plans. By the fall of 1929, it is believed that, with the steady progress now being made, it will be possible to show definitely the rate at which our great industrial strength can be developed in support of our military effort.

No definite and rigid plans can be made since the nature of the next struggle itself will bring into focus many of the blurred unknowns which cannot be approximated at present except by rule of past experience—a weak authority when warfare is involved. No stone is being left unturned, however, and, regardless of the political temper of the American people, of the viewpoints of the personalities in power, of the economic and industrial conditions then existing, and of the method of approach of the enemy—whether by land, sea or air—the Assistant Secretary hopes to be in a position to place the correct industrial wheels in motion with the least amount of friction and delay.

OUR ANTI-SUBMARINE REQUIREMENTS OF THE FUTURE¹

BY REAR-ADMIRAL D. ARNOLD-FORSTER, C.M.G.

TOWARDS the end of 1928 a Fleet Order was published in the press, stating that the Admiralty had decided to reorganize the submarine detector branch of the Service, and that in future it would be an independent branch separate from and equivalent to the gunnery and torpedo branches. As these new specialists are likely to play an important part in any warlike operations at sea in which we may be involved, an attempt to forecast the nature of future anti-submarine requirements may be of interest.

In trying to fit these requirements into some sort of perspective, it is useful to form some idea of foreign submarines now available for service in various parts of the world, whilst keeping at the back of one's mind a picture of those we found against us during the war.

Germany started the war with twenty-eight submarines, only four of which were over 600 tons, and Austria with eleven small ones. At the end of 1917, our worst year of shipping losses, Germany had a hundred and thirty boats, twenty of which were in the Mediterranean. By October, 1918, she had available three hundred and twenty-six. The earlier boats ranged from 210 to 750 tons, and were armed with torpedoes and one or two 14-pdr. guns. Later boats, some of which were mine-layers, were between 500 and 800 tons, armed with torpedoes and one or two 4.1" guns, and had a radius of action of about 8,500 miles. The latest submarine cruiser type of over 1,000 tons had one or two 5.9" guns, and a radius of action of over 18,000 miles. In addition to these were two hundred boats lost during the war, of which a hundred and forty-five are known to have been destroyed by our action.

The destruction of these boats involved years of strenuous effort, masses of material, and the employment of swarms of small craft, including some five thousand auxiliary craft. Of course the result of our anti-submarine measures and of the splendid services of the personnel of the patrol vessels, "Q" ships, hydrophone shore stations, and submarine hunting vessels of the allied navies and our own, cannot be gauged

¹ This article supplements that dealing with "The Submarine and its Antidotes To-day," by Lieutenant-Commander D. E. G. Wemyss, R.N., which appeared in the May JOURNAL.

by the comparatively small number of submarines destroyed. For, apart from that, innumerable attacks on many millions of tons of shipping were staved off or prevented. Nevertheless, until a navy has the power to destroy hostile submarines at sea with more certainty, and at a faster rate than is shown by these figures, it cannot be said to satisfy the requirements of modern naval warfare.

According to "Jane's Fighting Ships," there are projected, or in service at the present moment, about five hundred foreign submarines. Of this total, one hundred and eleven were completed before 1918, all these earlier boats, except eleven, being craft of under 600 tons. Doubtless most of them were built with a purely defensive object in view, the defence of coasts and harbours having been generally regarded as the primary function of submarines when they were first introduced.

The following table, compiled from the same publication, shows all foreign submarines completed since 1918. By that date every nation had been able to consider, in the light of war experience, what types were most likely to be of the greatest value to them. Those who believe it to be possible or likely that in these days secret building may be resorted to can add to the list of submarines as they think fit.

FOREIGN SUBMARINES COMPLETED SINCE 1918 OR PROJECTED.*

Country.	Below 600 tons.	600 to 1,000 tons.	1,000 to 2,000 tons.	Over 2,000 tons.
Denmark	5	—	—	—
Finland	3	—	—	—
Holland	21	—	—	—
Norway	6	—	—	—
Russia	3	4	—	—
Sweden	8	2	—	—
France.. ..	21	22	29	1
Greece	—	6	—	—
Italy	2	24	6	—
Jugo Slav	2	2	—	—
Portugal	3	—	—	—
Spain	6	6	—	—
Japan	3	42	26	—
United States ..	48	50	3	10
Argentina	—	3	—	—
Brazil	—	—	4	—
Chili	—	—	3	—
Peru	6	—	—	—

* Since this list was made at the beginning of the year, several more of the larger types have been completed by foreign countries.

Some of these submarines are fitted for laying mines. Their guns range from 3" to 6", and all carry modern torpedoes. It will be noticed that all the greater Powers and some of the smaller ones are providing themselves with the larger types that proved themselves so effective as commerce destroyers during the war. And no doubt many of the smaller modern boats could also be used to some extent against shipping in narrow seas, or on focal points not too distant from their bases.

In a world of nations bound by peace pacts, and at a time when disarmament is more eagerly discussed than war, it is not easy to forecast what part the fleet, or any of its component parts, will play in future warlike operations. The more so, because many vital problems that arose in the last war connected with tactics, communications, design, material and weapons were left unsolved by the test of battle, and because much of the valuable experience gained under the peculiar strategical situation in the North Sea is inapplicable when the main theatre of operations lies on other neighbouring seas or in distant oceans.

SUBMARINES AND BATTLESHIPS.

Amongst the unknown quantities which specially influence anti-submarine requirements is the much discussed question of battleship *v.* submarine. At the outbreak of war it was not generally believed that a few submarines could seriously restrict the movements of a battlefleet in the open sea, though it was fully realised that their introduction had upset the old ideas as to the position of battleships in "close blockade." But it was not long before it was considered essential to retain nearly a hundred destroyers with the battle fleet to be used whenever it went to sea, to screen its various squadrons from submarines.

From the anti-submarine point of view the important questions are—

- (1) To what extent will capital ships be risked in hostile submarine areas without strong anti-submarine escorts, especially on distant foreign stations where docking facilities are small?
- (2) Will submarines find it worth their while to use their torpedoes against modern bulged ships at all?

The point of these questions is, of course, that the more anti-submarine craft are required with the fleet, the fewer are left for other anti-submarine purposes, and vice-versa.

Not many battleships were hit by torpedoes during the war, but there were enough instances to make it clear that the risk to battleships of that day from the submarine weapon was very serious. The bulge protection of our present capital ships so reduces the risk of damage from torpedo attack, as to put the matter on a new footing. But against this, both submarines and torpedoes have become more efficient since

the war. Again, whilst improved methods for underwater detection tell strongly against the submarines, on the other hand, variations of similar methods can be employed by the submarines themselves to improve their methods of attack.

As to the target question, whatever may be thought of the efficacy of torpedoes against the bottoms of modern warships, there is no doubt at all about their efficacy against the bottoms of merchant ships. Merchant ships are as vulnerable now as ever to the torpedo, and will continue to be so. And apart from any extraneous means devised for their protection, merchant ships of all classes remain attractive targets for the torpedoes of any submarine.

It must be taken for granted that the war staffs of every naval Power, great or small, have taken in the more obvious lessons of the last war. They know that the determined attack on shipping nearly brought us to the end of our tether, and they have noted the respective parts played by submarines and surface craft in the business. With such information before them it is incredible that any hostile Power, or groups of Powers, would not include a submarine attack on our shipping as an important feature of their plans.

In the case of a recalcitrant member of the League of Nations, or a nation or group which decided to kick over the traces of civilization and do their worst, an unrestricted submarine attack on the world's shipping is conceivable. In this event, amongst the sea Powers we should be the one that would have to take the leading part in frustrating it.

A hostile neighbouring Power would doubtless look for great results from the untried method of massed aerial attacks on shipping and docks at our great commercial ports. For any naval Power, the sending out of cruisers and armed raiders on the trade routes would depend on the relative strengths and dispositions of the opposing fleets. But no hostile navy in possession of suitable submarines would neglect to use any that could be spared for attacks on shipping to greater or less extent. Indeed, a weak naval Power would probably see in the well tried submarine method his only chance of doing us more damage than we could inflict on him by blockade or other forms of pressure.

SUBMARINE WARFARE OF THE FUTURE.

The various forms which a submarine campaign might take are somewhat as follows:—

- (1) Threat to our warships operating in distant waters.
- (2) Sudden attack on shipping on an important route or local focal area.

- (3) Simultaneous attack on shipping on several routes and areas.
- (4) Unrestricted attack on shipping in any area.

N.B.—(1) might be combined with (2), (3) or (4).

The anti-submarine measures called for would vary in magnitude in corresponding degree. Their nature would depend largely on the extent to which hostile cruisers were able to operate freely.

Upon a sudden threat against our shipping from submarines, the very first defensive measure would be the immediate diversion of routes, followed by the rapid organization of the convoy system in the threatened area. The question of arming individual merchant ships at once with guns would be decided on its merits according to circumstances at the time. Valuable vessels obliged to pass through unswept areas likely to be mined by submarine or surface minelayers would be fitted with the "otter" bow mine protection gear, as used during the last period of the war. The fitting to merchant ships of the promising light wire net device for deflecting torpedoes, which came too late to be fully tested in the war, would be considered. Instructions would be issued for darkening ship, zig-zagging, and on the use of smoke screens.

These steps, together with the provision of suitable convoy escorts, the stationing of anti-submarine forces on threatened focal points, and off the hostile submarine bases, if possible to maintain them there, and off ports within the danger zone, would be amongst the measures to be instituted.

Improved methods of underwater detection should make the anti-submarine craft, whether engaged on escort or patrol duty, far more deadly hunters of submarines than they were formerly. Whereas during the war the explosion of a torpedo under a merchant ship often led to a wild rushing about of the attendant anti-submarine craft with the hope of getting a sight of the periscope, and a scattering of depth charges more or less by guesswork, in future such an incident should lead at once to a deliberate hunt, with every chance of success. It is reasonable to expect that a knowledge of the extreme risk of detection and destruction involved in submarine attacks on convoys or escorted ships would do much to deter such attacks altogether.

During the war, uncontrolled mines laid in enormous quantities, as well as nets studded with mines, were used offensively against submarines with considerable degree of success. But the possibility of using them effectively in that way depends on depth of water, geographical conditions, our power to prevent sweeping operations, and other important considerations. And it would probably be considered unprofitable to sow the sea with uncontrolled mines with the hope of catching a few

submarines, if their destruction could be sought for in some other way with reasonable chance of success.

Except for the minefields, the efficiency of every branch of anti-submarine work at sea during the war was hampered to the end by the want of an efficient and reliable device for detecting submarines under water, under any conditions, and at reasonable ranges. The hydrophone flotillas with their listening devices, by dint of practice and enthusiasm attained to a remarkable degree of efficiency; they made the very best of the apparatus they had, but everyone who had experience of the work realised how limited were the possibilities of success open to them.

UNDERWATER DETECTION.

During the last few months of war a new scientific method of underwater detection for use at sea, based on sounder principles than anything that had been tried before, was under trial; and for some time a reliable electric method of detection had been in use in connection with passive mine defences in shallow water. From the very beginning it was felt that underwater detection was the key to success in anti-submarine work, both offensive and defensive. So under the circumstances it was wise to start afresh on the new lines, retaining old methods only so far as they assisted or supplemented the new ones.

After the war thousands of officers and men of the Reserves, most of whom had become highly skilled at anti-submarine work, many of them with scientific attainments, were demobilised. Almost the only naval personnel remaining with practical experience of the work, were a proportion of the destroyer and submarine officers and a few who had been employed in the Naval Air Service. Masses of gear and apparatus of all kinds that had gradually been brought into use were scrapped, and the swarm of auxiliary craft was paid off, and all shore hydrophone stations dismantled.

The principles of the supersonic waves used in beams for underwater detection are now well known in the scientific world, and judging from the great advance in the application of other scientific discoveries of a similar nature, it is certain that the use of these new beams will be further developed, and their present somewhat limited range increased. The supersonic beam has for some time been recognised as a means of detecting the presence of invisible icebergs, and of ascertaining the depth of water.

Though the search for an efficient underwater detection apparatus for anti-submarine craft was always a highly scientific problem, the provision of suitable weapons was never so. The wonder is that the

comparatively simple depth charge was not evolved before the war. Either dropped from the stern or projected a short distance by a simple form of howitzer, it is likely to remain one of the chief offensive weapons for use against submerged submarines. Hitherto the torpedo, which is still the primary weapon of a submarine in her anti-submarine capacity, has been regarded as of little value against submerged submarines, and a very chancy weapon against submarines on the surface.

The Navy List shows, under H.M.S. "Osprey," the personnel of the Anti-Submarine School at Portland, where the new system of submarine detection is being developed for practical use at sea. It will be seen that, in addition to the naval staff, there is a strong civilian staff of scientists and technical officers. The Navy List also shows that already about thirty officers of Lieutenant's and Lieutenant-Commander's rank have completed the prescribed course at Greenwich and Portland, and qualified in anti-submarine duties. Those not retained at the School for instructional and experimental duties have been appointed in the first instance to the staffs of Admirals afloat, and to destroyers and submarine flotillas.

ANTI-SUBMARINE CRAFT.

Attached to the School, besides a couple of small experimental craft, there is a 1,250 ton sloop, and a submarine hunting flotilla, consisting of four destroyers of 1,000 tons, and three patrol boats of 600 to 700 tons. The local submarine flotilla, consisting of seven "H" Class 450-ton submarines, and one "R" Class of 420-tons, affords constant practice to the anti-submarine flotilla in hunting submarines at sea, both for training purposes, and for trying out and improving their tactical methods. The standard of efficiency required for hunting craft is, of course, that if a submerged submarine passes within detection range of any one of them, it should be possible to keep hold of the submarine, whatever it may do, until depth charges have been dropped over it.

Even with improved detection gear, active anti-submarine work will always necessitate the employment of a large number of small craft. The Portland flotilla can only be regarded as a bare nucleus of an organization for supplying the requirements of the battlefleet, convoys and patrolled areas. There are at present a hundred and sixty efficient destroyers varying in size from 1,000 to 1,800 tons, and it seems inevitable that, in the event of a menace from submarines, the brunt of the anti-submarine work should at first fall on them.

By sacrificing the after gun a destroyer can carry a large number of depth charges ready for immediate dropping; her chief drawback for the work is her somewhat limited range of action, which restricts her

employment at great distances from her base. The flotilla leaders of 1,600 to 1,800 tons, of which there are eighteen, would probably be called on for anti-submarine duties when rather larger vessels than destroyers were necessary. The larger cruisers employed on escort duty with ocean convoys would be unsuitable for hunting submarines. For them, detection gear would be of defensive value, and should give them time to turn away from an attacking submarine before it got within effective torpedo range. There will still perhaps be a limited use for steam trawlers for anti-submarine work off harbours and bases, but in view of the increased underwater speeds and heavier guns of modern submarines, they are not likely to be used again in large numbers in the open sea.

Amongst other potential anti-submarine craft must be included our own seventy submarines; underwater craft having proved themselves in the war to have a definite offensive value against their own kind under certain conditions. Then there are the thirty-five sloops of 1,200 tons, useful little craft, but not specially adapted for offensive anti-submarine work; and thirty-five minesweepers of 800 tons intended for special work of their own.

Though aircraft are not likely in themselves to prove reliable or effective in destroying submarines at sea, they will often, when available, be of great value in anti-submarine operations in conjunction with sea craft. Their special value lies in their mobility and their ability to see. Under suitable conditions, such as often exist in the Mediterranean, they can see submarines below the surface in their vicinity; in clear weather their great range of vision enables them to sight a submarine on the surface over a large area; they can then warn shipping to keep clear, and put any anti-submarine craft in the vicinity on its track. Thus aircraft of various kinds working in co-operation with efficient hunting vessels, will add greatly to their effectiveness and make up for their paucity in numbers, whether with a convoy, or in the patrol of danger areas. But it would be unwise to rely too much on the co-operation of aircraft for anti-submarine operations that might be required at short notice in any part of the world. One can easily imagine many occasions when they would not be available, or when the conditions for using them would be unfavourable.

A PROPOSED NEW TYPE.

New methods of naval warfare have generally produced new types of ships. Thus torpedo-boat warfare brought the torpedo-boat destroyer and other examples could be quoted. But it is remarkable that the intensive submarine war on shipping has, so far, brought forth no new type of vessel specially designed for work against submarines. In this connection it has often been suggested that there is a real place in the

scheme of things for a new seaworthy type of small cruiser of about 3,000 tons, with a maximum speed of 20 knots, designed specially for anti-submarine work.

Such a craft would have to be built as torpedo proof as possible, since, like aircraft carriers, she would be an inviting quarry to hostile submarines. Her gun armament would be rather more powerful than that of the latest submarines, and therefore sufficient to put her on terms with an extempore surface raider. Her main armament would consist of anti-submarine weapons, and she would of course have the most up-to-date submarine detection devices. A kite balloon, with means of inflating it, and a scouting aeroplane or seaplane would add greatly to her value.

These small cruisers would control the destroyers and other anti-submarine craft working on focal areas; their speed would be equal to that of any submarine on the surface, and fast enough for convoy escort work, if required. In peace time they could well take the place of the present 1,250 ton sloops, which now police the seas and show the flag on foreign stations, but which have no offensive value whatever against submarines.

It would be well that there should be visible tokens in every corner of the Empire of our power to defeat a submarine attack on shipping. The presence of these small cruisers on a foreign station would do more than anything else to make the idea of submarine attack on our floating trade an unattractive one, and to deter the building of submarines for that purpose.

Though the abolition of submarines has very much to recommend it, and is desired by many, it is probable that when the world decides to get on seriously with disarmament, submarines will be amongst the last warships to go. And when all navies have been reduced to their ultimate limits, anti-submarine craft will be retained amongst the police forces of the seas.

THE TRAINING OF THE INFANTRY SOLDIER

BY MAJOR J. M. MILLING, M.C., *p.s.c.*

"The military object of modern training must be to foster disciplined individual initiative . . . it is questionable whether we do enough to foster the individuality of the soldier."

Memorandum on Army Training, Individual Training Period, 1927-1928.

ONE may inquire, what is the first essential of war? Obviously the soldier. What is the first essential in the soldier, assuming always that he is in full possession of the normal physical attributes of man; surely, bravery, in other words, moral endurance. That this has always been recognised is proved by the care and thought bestowed on that side of military training throughout the ages.

Hitherto, the main problem has been how to influence the mind of the combatant during his training in peace in such a manner as will cause him to overcome in time of war all those instincts and tendencies which might run counter to the end in view. All the resultant methods of training may thus be said to have turned on the single phrase "inculcation of discipline," for discipline has stood the test of time and of war. Even at the present moment, we do not believe that we can possibly dispense with such discipline.

But some change in this point of view now appears to be called for. In the past, all systems employed for creating or strengthening discipline have been based on the application of methods founded on the known laws of mass psychology; that is, we have always trained the combatant as it were "in bulk," and with the idea of "mass fighting" at the root of all our training.

The late war, however, was productive of new weapons—weapons like gas and the tank which, wielded by a few, overcame thousands: and this feature of modern war seems to have become permanent. It appears reasonable, therefore, to assume that policy will aim at eliminating the human element from the battlefield of the future as far as possible. As an exaggerated example, one may visualise a solitary man, lightly armour proofed and armed with a lethal or automatic weapon,

called upon to defend a certain area which heretofore would have been garrisoned by a platoon, or even a company. What will he do when he is attacked? Either he will retreat or he will hold his ground. If he holds fast, it will be due to his sense of discipline or to his innate courage.

Reverse things; set him to attack. In this case it is obvious that neither discipline nor courage alone will see him through, nor yet a combination of both. He must have something more. He must have the power to think and act for himself. In other words, he must possess individuality.

Now, what is it that develops individuality? Generally speaking it is being thrown on one's own resources. A flock of sheep is possessed of no individuality. A man moving with a crowd displays none, unless he endeavours to influence it one way or another. If the soldier is to be equipped with those powers of reasoning and initiative which will enable him to think and act for himself, his Individual Training period must be devoted to developing these qualities.

To what extent is the individuality of the soldier at present being developed? Generally speaking, the individual portion of a soldier's training is devoted mainly to the elements of discipline—drill, deportment, use of weapons. Further than this he is taught how to read a map, to use a compass; he is initiated into the outer mysteries of scouting. But none of these subjects tend overmuch to cause the soldier to use his own resources, or to inspire initiative in him. The higher standard of education required these days goes towards improving the foundations, to increasing the intellectual capacity. The Physical Training expert induces, or tries to induce, one to believe that the physical exercises he invents go towards developing a man's reasoning power. Perhaps they do. If so, it is again all to the good. But there are many other methods of developing initiative, self reliance and resource in the individual *during the actual military periods of training*, if only the person responsible for the training will, himself, use a little initiative and imagination. Here once more is the same problem in another form.

Now, our chief difficulty at present is that the training of the individual on the new lines calls for a good number of really competent instructors. That means more thoroughly trained N.C.Os, and, incidentally, officers better able to train because they are better trained themselves. The standard all round becomes automatically higher.

The writer has already reviewed the question of the individual education and training of the officer.¹ It was shown that the crux of that

¹ "The Training of the Army Officer," R.U.S.I. JOURNAL, August, 1928.

problem was the *time factor*. In exactly the same way the time factor affects the problem now under consideration ; once more one is faced with the question of hours, since they are already sufficiently long.

Military service is voluntary. The flow of recruits to-day is essentially dependent on the attractions of the Service. Financial inducements are already at their maximum. Over-long hours must act as a deterrent. Therefore, if we are to find time to give the soldier this necessary training, we must look to economies in existing time-tables.

We have already inferred that an undue proportion of the Individual Training period has, up to date, been accorded to the elements of discipline. For instance, how much time is devoted to proficiency in the use of weapons ? Do not the majority of Company Commanders regard the Individual Training period, whether a month or longer, as a period set apart for special preparation for the musketry classification season ? Surely that is not right : should not this period be regarded rather as one set apart for the training of the individual soldier to take his place in battle, i.e., his tactical training ?

There was a period when battalion drill was the basis of manœuvre. To-day it has become one of the elements of discipline : in the nature of adjutant's parades, sergeant major's parades, guards, it is now part of the whole annual routine, and is generally excluded from the Individual Training period. So, too, nowadays do education, physical training and bayonet fencing form part of the annual routine. Is there any reason why to their number should not be added musketry ? Is it expedient or necessary that the period of Individual Training should be deprived of precious hours in order to promote an element of efficiency which should, in fact, be maintained all the year round ?

In the case of Lewis gun training, it should surely be possible for its mechanical side to be sufficiently inculcated throughout the year. The tactical aspect would be a legitimate entry for the Individual Training period. In the case of the rifle, once a soldier has fired his Table "B", once he has reached a reasonable standard of efficiency, say, has become a good second class shot, he should be urged thereafter to train and improve himself as an aspiring marksman. The pay qualification alone should produce the incentive. The drill movements in a recruit's training should be evolved into natural and non-drill dexterity and ease ; standard tests should, for him, become a thing of the past. Their elimination, for that matter, from the military schedule of the trained soldier is strongly advocated. Individual exercises, lying and kneeling only, steady aiming, rapid loading and firing, trigger pressing and snap shooting, combined throughout the year with as much practice as possible on the short and long range, and miniature range, should

serve to ensure adequate progress in a soldier's proficiency in his weapon. It should at the same time produce a standard of musketry in the Army as high as, if not higher than, that acquired during what is now regarded as the legendary days of musketry in the British Army, namely, in the years preceding the Great War. In the case of the machine gun, a similar principle applies, though with some modification owing to the greater technicalities of the weapon. For instance, it may be that the novice's first year's training may have to be virtually limited to the mechanical side, the tactical being relegated to the second and subsequent years.

The adoption of this principle alone should go far towards providing the *requisite time* during the Individual Training period for the development of individuality. It might, of course, be urged against these suggestions that climatic conditions in the British Isles during the winter months militate against the work in the field which tactical training demands. This fact is admitted, but, though constituting a genuine obstacle, it should not be insurmountable. In any case, the same obstacle cannot arise abroad.

Apart from the fact that, until recently, physical fitness and proficiency in the use of weapons have been regarded as the main requirements of the private soldier, are there any other reasons why so great a proportion of time is devoted to them? If so, are these reasons sufficiently important to outweigh the claims for developing individuality? One would like to consider for a moment *Competition*. But in considering this question we must not lose sight of the effect of competition or rivalry on the human element. For what exactly promotes competition? Does it not arise mainly from *esprit de corps* or individual desire for advancement? And the former is indeed vital in the Army, the latter also a necessity, since it constitutes a deep stimulus to efficiency and progress, provided always that it is kept within the bounds of moderation. But competition, whatever form it may assume, implies relativity. The easiest method of obtaining a comparative statement of relative values is to be found in percentages and figures of merit. But that is where the evil, or shall we call it the difficulty, lies; for in certain branches of training there is no possible figure of merit, whereas in others it very certainly does exist. How can one, for example, truly apply a figure of merit or percentage to the tactical efficiency of one platoon as against another? A commander may, to a certain extent, and with time at his disposal, assess the relative merits of units under his own immediate supervision, but the values he attributes to each can bear no relation whatsoever to any of those units of which he has no personal cognisance, that is, the Army as a whole.

In the case of musketry, education, physical efficiency, games and sports, there can be, and are, definite standards which can be expressed in the form of percentages. But do they not, for that very reason, exert undue influence, owing to the frailty of human nature in the desire to stand well with higher authority and to achieve personal advancement. In other words, are not the dice apt to be overloaded in favour of those branches of training which are capable of being translated into definite figures of merit or percentages?

Let us consider musketry, for example. In point of actual fact, what is the real difference between the various classes of shots? No doubt the third class shot is 'no master of his weapon (theoretically), but is the man who obtains fifty points only in his classification so very inferior as a soldier (ballistically)? Is there not a chance that while passing judgment on a unit on the result of the year's classification, undue weight is attached to these relative values? Did the thin line which held the German attack in 1914 do so merely because they were expert marksmen, or because they were courageous men, exceedingly handy with a bullet pump (better known as a rifle), and able to pump it in the right direction? The good shot is always to be found; the sniper will always be available, for the number of the latter required is never legion. Moreover, is it not the stopping power of the section or the platoon as a whole which is the true criterion of battle efficiency: and is this ever tried out in an ordinary range practice?

This contention may in itself sound pure heresy. To the devotee of percentages it certainly will; but will it so strike the man of more modern and broader vision? Let there be no misapprehension. It is not desired to decry standards of efficiency; they serve a definite and useful purpose and are therefore sound and necessary. But the real danger seems to arise when undue weight is given to them. The writer feels that until the higher education and training of the individual officer, the development of the N.C.O., and the military individuality of the private soldier are really accepted and insisted upon, this danger will remain.

A DECADE OF PROGRESS IN AIRCRAFT DESIGN

By C. G. COLEBROOK.

THE year which has seen, or will see before its close, the tenth anniversary of such historic events in British aviation as the first direct flight by aeroplane over the Atlantic Ocean, the first flight to Australia and South Africa, besides the first double crossing of the Atlantic ever made by airship, is not unfitting as one in which to review the technical developments, both Service and civil, made during the last decade by British aircraft. Such a review is particularly appropriate at a time when there is displayed in the Museum of the Institution, a whole range of aeronautical models illustrating much of the story of progress and when the recent International Aero Show at Olympia is still vividly in the memory.

At the head of the procession, so to speak, are such famous aircraft as the Supermarine-Napier seaplane which won the Schneider Trophy for Great Britain in 1928 at a speed of over 281 miles per hour, and then last November, set up a new British speed record of 319.57 m.p.h., and the Fairey long distance monoplane, also fitted with a Napier Lion engine, which this Spring flew non-stop from England to India in just under forty-nine hours. These two aircraft in their respective classes undoubtedly represent a very high order of technical skill in design and also of engineering construction, while they are striking examples of the beauty of modern aircraft as compared with those of ten, and even five, years ago. These two machines might have been sketched by an artist on canvas and then translated into actual form by an engineer; in fact, it is an effective, if a non-technical, method of gauging the immense advance which British aircraft have made in the last decade to view them from the artistic standpoint. This may seem a crude test, but, broadly speaking, an aeroplane that satisfies the eye is usually one which, from an aero-dynamic standpoint, is of a high order of efficiency. A simple example is a comparison of the first Fairey III.D. seaplane and its modern successor, the Fairey III.F., with its graceful easy flowing lines leading the air smoothly past its sharply pointed nose. Both

machines have identically the same Napier Lion engine, yet how great is the contrast between the way in which the one machine pushes the air aside and the other parts it like a spearpoint. Similarly the difference between the clumsy flat bottomed floats of the earlier seaplane and the well shaped and carefully designed lines of the modern metal float speaks of the advances made, not only in reduction of water resistance but also of drag when in the air.

The first main feature which stands out, then, is the advance the British aircraft constructor has made in diverting engine power from the wasteful process of pushing the air away in front, and sending it swirling back in protesting eddies clutching as it were at the aeroplane all the time, to the supremely useful purpose of increasing its forward speed; and how vital this may be can be illustrated by the experience of the specially "cleaned up" Moth light aeroplanes in the recent King's Cup race. The standard Moth with a projecting top tank, two open cockpits and normal undercarriage, has a top speed of 103 miles an hour; the racing Moth with the cockpits closed in, the top tank made flush with the wing, and a smaller undercarriage, had a top speed of 123 miles an hour with an engine of 100 h.p. Had the machine been kept unaltered another 75 horse-power would have been needed from the engine to attain the same result; and, in practice, the extra horse-power would have entailed a heavier engine and more fuel, so actually the result could not have been attained.

The Services must realize, therefore, that when they put another piece of military equipment on a machine, even a gun sight or a range spotter, which projects from the fuselage, they are adding yet one more handicap to the aircraft designer, who is ever striving to reconcile his ideal of a perfect aeroplane with the many but necessary requirements of Service operation. Fortunately of late years there has been a much better appreciation of this vital fact, and one of the chief advances made has been the more general acceptance of disappearing gun mountings which, except when in use, do not detract from the machine's performance. The next big advance made in recent years, and one which only pilots fully appreciate, is the improvement in the controls of the aircraft throughout the speed range, until to-day an aeroplane is expected to be as light on its controls at its lowest speed as it is at the highest.

There is at least one high performance fighter whose top speed is over 200 miles an hour and its landing speed about 60, which, so far as the weight on the controls is concerned, feels exactly the same throughout the speed range; while the earlier idea that a machine's top speed could not be much more than three times its minimum speed has long since been exploded.

There are two other developments which may usefully be dealt with now, and these are the Handley Page automatic slot and wheel brakes. It is not necessary to say very much about the former, except that the added lateral control given to a machine when at angles above the stalling incidence has revolutionized the safety of flying by averting that disconcerting and often fatal dropping of one wing and subsequent spin. But it has done more than that, for it has now given the pilot of a flying boat just that lateral control which is all too slight when the boat is flung off the water in rough sea before it is entirely air-borne; and, conversely, it enables the same pilot if forced to alight on a bad sea to put the boat down at a lower forward speed than was the case with a wing without slots, again minimising the risk of damage.

Wheel brakes are only now being introduced generally, but they should have a decided value to aircraft working from a carrier, while they should also increase manoeuvrability on the ground. In the case of big machines, they may easily save much equipment in a forced landing, as often the aeroplane is landed safely and then with the pilot powerless to do anything it runs on until it hits a hedge or tree.

But the partner of the aircraft designer, the aero engine maker, must not be forgotten, and undoubtedly to-day efficiencies undreamt of a few years ago are being realized with power units. Weights have come down until to-day engines of 500 horse-power and more are available at a cost of not more than one-and-a-half pounds in weight per horse-power, and, what is more, the rated power is being maintained up to heights of 11,000 feet. Design has been revolutionized in all directions. Radial engines are steadily shrinking in size and growing in power. In the most modern type of water-cooled engines, welded cylinder jackets are dispensed with and the two lines of six cylinders are cast in one light shell of aluminium, all explosion stresses on this shell being eliminated by the use of steel cylinders, easily detachable and replaceable. Thus overall length is reduced, crank case weight saved, torsional resonance problems simplified, and the clean and small frontal area of the Vee-type of engine preserved. Compression ratios of six and seven to one can be used, and, in addition, practically every class of engine, whether it be radial or water-cooled, is now to be had with moderate or full superchargers according to the particular operating height required from the aircraft.

Only the aero engine designer realizes what this means, but the metallurgist, who has been pressed to produce special steels and alloys, knows the scientific research that has been necessary to take higher powers out of a unit for the same or less weight. The extra heat must be dissipated in some way, and probably there is no more interesting chapter

in British aero engine practice to-day than that dealing with the conquering of this problem in the radial air-cooled engine. The whole of cylinder design has been altered, valve gears re-modelled and carburation systems revised in order to secure these higher efficiencies, while a whole fund of research has had to be devoted to evolving a gear-driven type of supercharger, in which the sudden variations of engine torque, due to the opening or closing of the throttle, shall not break up the supercharger drive through the influence of inertia forces.

It is only a few years ago that both radial and water-cooled engines hovered round the 400-450 h.p. figure, whereas to-day those same engines give 500-560 h.p., and special engines, still for Service use, develop 800 h.p. and more, both in the air-cooled and water-cooled types. Now even higher efficiencies are in prospect by the use of liquids with boiling points much higher than water, enabling the working temperature of the jacketed cylinder engine to be raised; or, alternatively, by the use of evaporative cooling still further reducing installation weights and vulnerability. This system in which the only water is that in the jackets with a small radiator to condense the steam, is already installed in the engines of the new State airship, and it is but a question of further development for it to be adapted to aircraft engines.

A further advance, this time on the part of the radial engine, is the introduction of reduction gears, enabling the engine revolutions to be lifted to give increased horse-power, while the airscrew revolutions are kept down to that enabling the maximum thrust horse-power to be developed by the propeller. This in turn introduced added problems in cooling the cylinders owing to the lower rate of slipstream, but this has been overcome by a revision of the whole of the cowling of the engine; and, coupled with this, has come some valuable research into the whole problem of adequate air cooling combined with the minimum of head resistance. The drag of the radial engine has been its most serious handicap, and while it is too early to speak definitely of the results obtained it seems that just as the water-cooled engine had made a step forward its rival has found a way to redress the balance again.

The broad results of the efforts of the aircraft and engine designer may be summed up in the statement that the latest Interception Fighter class can now exceed a speed of 200 miles an hour at 20,000 feet and can climb there in just over ten minutes at a forward speed which during the war represented the top speed of many types of aircraft. Flying boats have ranges which permit of flying ten hours and more without refuelling, and the average speed of fast day-bombers is over 150 miles an hour carrying as useful load (that is crew, fuel, oil and equipment) nearly 2,000 lbs.

The Far East cruise of four British flying boats to Australia and Hong Kong, during which they covered 27,000 miles and remained independent of any proper seaplane base for a year, is sufficient evidence of the immense strides made by British marine aircraft, and we are now within sight of larger craft which will be able to fly from England to Australia calling if need be only at British bases *en route*. Our torpedo plane carriers have now a performance which enables them to carry a rear gunner to defend the machine against attack. A specially built seaplane was used from a compartment of a submarine in the spring cruise of the fleet in the Mediterranean. There is no space to do more than mention the British light aeroplane, which in less than four years has made its way into every country in the world and is an accepted method of world travel for the private owner, besides being a most economical form of early training machine for Service use.

Finally, to complete this broad review of the main lines of British progress, reference must be made to the abolition of the timber built machine in favour of that in which the whole of the construction, with the exception of the fabric covering, is metal. The British aircraft industry has effected the change in three years, and it has profoundly influenced both the performance and the durability of aircraft. There is, for instance, a saving in weight as compared with wood of about 15 per cent. in the majority of land machines, and in the case of flying boats the percentage saving rises to as much as 25 per cent. of the structural weight. There is a further advantage in the absence of water soakage which always occurred in wooden hulls—the difference in weight arising from these causes between one wooden type of boat and the equivalent all metal hull comes to nearly a ton. There are manifest advantages to the nation in the development of the all-metal machine, for it means that given care in the treatment of the components against corrosion its life is practically indefinite. This was shown when a certain batch of all metal aircraft were returned for re-conditioning at the end of three years; practically nothing had to be done in the way of replacement; therefore, as machines pass out of service through the production of more modern types, the older craft can be sent into store as an emergency war reserve with a certainty that they will not deteriorate to the point of not being worth their keep.

Thus from a national standpoint what is known as the stored reserve problem is simplified, though it must be remembered that as the aircraft designer each year produces machines with yet more performance there is a limit to this process. It is not possible now to discuss the effect these advances in efficiency will have upon Service problems, but it will be clear that the Air Staff, both afloat and ashore, have a much more

powerful weapon to their hand, and one which can fill an increasing number of purposes. The range of reconnaissance is extending, while the time taken is lessened; the personnel are better able to defend themselves while carrying out their duty; the whole sphere of air operations is lifted to higher altitudes; the radius of action of the bomber and torpedo plane is widening; and both fighters and bombers can be manoeuvred in Squadrons and Wings with deadly effect. Short and long wave wireless has given the Staff control of units unseen; navigation instruments have become increasingly reliable, and direction-finding apparatus has reached a point of real utility; while finally, further developments in directions which need not be specified too closely appear to offer an even greater efficiency to the aeroplane as the eyes of a commander and as a gun platform of high speed and very wide range.

EXHIBITION OF AIRCRAFT MODELS IN THE R.U.S.I. MUSEUM.

The Exhibition of Aircraft Models, referred to in the above article, was opened on the 5th August, and will continue for some months. It includes models illustrating some of the very earliest attempts to design a flying machine, a section depicting the development of the seaplane, another that of the flying boat, and a third that of lighter-than-air craft. There is, also, a full-sized reproduction of a pilot's cockpit, the controls of which are connected so as to manipulate a model aeroplane.

The Institution is indebted to the Air Ministry, and the Department of Overseas Trade for the loan of the exhibits, and for co-operating to secure their most effective display.

THE DEFENCE FORCES OF NEW ZEALAND

BY COLONEL C. G. POWLES, C.M.G., D.S.O., A.D.C.,
N.Z. Defence Forces.

TO appreciate fully the present organization, administration and training of the New Zealand Defence Forces we must go back into the history of the Dominion.

In the early days of the XIXth century the islands of New Zealand were visited by many whalers who formed small shore stations for repairs to their ships, for the procuring of spars and for the trying out of the whale blubber. These small shore stations were the beginnings of the colonization of this fertile country. Now these whalers found both islands populated by a remarkable native race, the Maoris, whose outstanding characteristics were a rigid tribal etiquette, unbounded hospitality and a fine physique combined with marked fighting propensities. Fierce tribal wars were constantly occurring and were not lessened by the appearance of the white man with his liquor and firearms, both of which he freely bartered. Firearms were even procured in London by the natives themselves, for a chief named Hongi, in 1827, actually there purchased 300 muskets and ammunition, which he took back to New Zealand, where he armed his tribe and caused great destruction and loss of life in the neighbouring districts.

As a result of these ceaseless tribal wars, friction with the white man was bound to come, and, in 1834, as a reprisal for the murder of some English subjects, H.M.S. "Alligator" shelled the Maori village of Waimate in Southern Taranaki, landed a party and destroyed it. This was the first time a British force landed in New Zealand.

By 1840 the good influence of a devoted band of missionaries had so far prepared the Maori for peaceful ways that the New Zealand Land Company, under Colonel Wakefield, began sending out shiploads of immigrants. In the same year the first Governor of New Zealand was appointed and the islands formally taken over as the Colony of New Zealand. At the same time also was signed the famous Treaty of Waitangi between the Governor (representing Queen Victoria) and the greater number of the chiefs of the Maori race. This Treaty provided for the preservation to the tribes of their lands and fishing rights, while they on their part acknowledged the sovereignty of the Queen. Shortly after these momentous events trouble came upon the young Colony causing the birth of the Defence Forces. A great fighting chief,

Hone Heke, rebelled in the far North, and two fierce and influential chiefs attacked the settlers in the Hutt Valley near Wellington. For the restoration of order and safety of the rapidly growing settlements the 58th Regiment was brought across from New South Wales, and in 1845 the first Militia Act was passed by the New Zealand Government, providing for the service of all males within an area of twenty-five miles from their place of residence. This enactment placed some 350 settlers under arms in the disaffected portions of the Auckland and Wellington districts. The European population of the Colony at this time, though rapidly growing, only numbered 13,000, and the Maoris were estimated at 55,000, of whom the greater number were of undoubted loyalty to the provisions of the Treaty of Waitangi. But scarcely had these rebellions died down than the Taranaki and Waikato Wars began, lasting until 1870.

Commissions in the New Zealand Militia were, in the first instance, granted to officers of the Regular Army, who had taken service under the New Zealand Government or who had resigned from the Army and become settlers. Special concessions were offered to officers, non-commissioned officers and men, time expired from the British Army, to settle in New Zealand by the grants of land varying in size according to rank. An Act for the enrolment of volunteers and the constitution and establishment of Volunteer Squadrons and Companies came into force in 1858. The settlers naturally took more kindly to voluntary service and gradually the Volunteers or Volunteer Militia, as they were first called, increased in numbers and efficiency, and less necessity existed for the compulsory service of the Militia.

The Maori, naturally a brave and stubborn fighter excelling in hand-to-hand fighting, was also a past master in the art of field engineering, so that his subjugation proved to be a long and costly business. From 1861 to 1864 British troops continued to arrive. At one time during this campaign there were some 10,000 Queen's troops employed and the Navy provided a land force of 300 men. In addition, by 1864, there was a force of 5,000 military settlers in the field enrolled under the Militia Act. Many actions were fought with more or less success, but there seemed to be faint prospect of peace and the financial burden of maintaining such a large force of regular soldiers for such a slow process of wearing down the enemy was severe.

The colonists then came to the conclusion that if they had to pay and support all troops engaged it would be as well to be responsible for the complete direction and control of the war. Moreover, it had been very early recognised that the Volunteer and Militia squadrons and companies on active service, by their knowledge of the methods of

fighting adopted by the enemy and of the intricate country into which it was necessary to penetrate, were indispensable if any progress at all was to be made. Further, by their courage, endurance and resourcefulness and the success with which they threw off the stereotyped system of the Regular Army's fighting and adopted that of the enemy, the colonists showed that the completion of the campaign could safely be left to them. The New Zealand Government accordingly asked for the withdrawal of the British regiments. This was agreed to, and by 1866 the bulk of the Regular Army troops had gone and the task of restoring peace left in the colonists' hands. By the end of 1869 the task was completed by the Militia and Volunteers, aided by bands of friendly natives, with such success that no further racial wars have taken place, and the two races are now one people equal in loyalty to the Crown.

So much for the birth of the Military Forces of New Zealand and their early training in an exceptionally difficult campaign. Men who had fought for their homes through ten years of strenuous effort carried on the volunteer companies, and their sons and grandsons formed the troops sent to South Africa and, in the Great War, to Gallipoli and Palestine and France, where they stoutly maintained the soldierly efficiency so hardly won by their fathers in these Maori Wars.

The first New Zealand regular force was brought into existence by the Colonial Defence Force Act, 1862, providing for a force of Europeans with a sprinkling of Maoris, which was not to exceed 500. Under the provisions of the Armed Constabulary Act, 1867, this Colonial Defence Force became the Armed Constabulary with two branches—a "Field" and a "Civil" branch. After 1870 the Militia as an active force ceased to exist, and the military system of defence became under peace conditions solely voluntary, with a trained Permanent (regular) Staff of officers and non-commissioned officers for purposes of administration and instruction.

In 1886 the Civil branch was incorporated in the Civil Police Force and the Field branch became later the Permanent Artillery and Submarine Miners, whose chief duties were the manning of the defences of the main ports. Later these two bodies became the Royal New Zealand Artillery of the present day, responsible for providing training cadres for the Field, Medium and Coast Defence Territorial batteries throughout the country.

The last time the Volunteer Corps were called out for active service in the country was in 1881, when all volunteers in the Taranaki and Wellington Provinces together with some companies from the Auckland and Nelson districts were mobilised and sent to Taranaki, where serious trouble with the Maoris was imminent. But the prompt arrival of this

large force in the disaffected district averted bloodshed and the disputes were peaceably settled.

At the close of the Maori Wars, in 1870, there were some 6,568 volunteers enrolled in the Colony whose total European population had risen to 256,000. At the close of the South African War, which greatly stimulated volunteering, the total enrolled volunteers of all arms was approximately 14,000 out of a population of 775,000.

In the year 1909 a Defence Act was passed by the New Zealand Parliament laying down the principles of Universal Training of all persons between the ages of 14 and 25 (from 14 to 18 in the Cadet Companies and from 18 to 25 in the Territorial Force). In this year the total strength of the Volunteer Corps had risen to 14,058 all ranks and 4,100 Cadets.

In 1910 Lord Kitchener visited New Zealand and as a result of his advice steps were taken to put into practical working the provisions of the Defence Act, 1909, with the result that in 1911 the Volunteer system ceased to exist and its units were replaced by Territorial and Cadet units carrying on wherever possible the old volunteer name and traditions.

The Dominion of New Zealand was divided into four Military Districts :—Auckland (the Auckland Province), Wellington (the Provinces of Wellington, Taranaki and Hawkes Bay) in the North Island ; and in the South Island, Canterbury (the Provinces of Canterbury, Marlborough and Westland), and Otago (the Provinces of Otago and Southland).

The four Districts provided in all :—

12 Regiments of Mounted Rifles.	3 Mounted Sig. Troops.
17 Bns. Infantry.	2 Div. Sig. Coys.
5 Coast Defence Detachments.	9 Coys. A.S.C.
9 Batteries of F.A.	7 Field Ambulances.
9 Coys. Garrison Artillery.	
32 Coys. Engineers (including Field, Post & Telegraph and Railway).	

The number of Cadet Companies was unlimited, the object being to absorb all those eligible for service as Cadets.

The training prescribed for the year was :—

<i>Territorial Force ;</i>	(a) 30 Drills of 1½ hours' each.
	(b) 12 Half-day parades.
	(c) 7 Days' camp.
<i>Cadets ;</i>	(a) 50 Drills of 1 hour each.
	(b) 6 Half-day parades.

The numbers under training on 31st May, 1914, were in the Territorial units, 25,684 ; and 25,332 Cadets.

The strength of the Training and Administrative Staff (Permanent Force) at the same date was : New Zealand Staff Corps (Officers), 121 ; Permanent Staff (non-commissioned officer instructors), 211 ; and in the Royal New Zealand Artillery, 17 Officers, 298 other ranks.

Such was the organization and strength of the New Zealand Defence Forces when the Great War broke upon the world. Fortunately for New Zealand a three years' trial of the scheme had enabled the training to become so firmly established that it was carried on during the war without interruption and proved suitable to feed the Reinforcement Camps with trained Territorials, the majority of whom had served for four years in the Cadet Force and two years in the Territorial Force before proceeding to the front. This provided the Expeditionary Force with the stiffening of trained officers, non-commissioned officers and soldiers who proved of the utmost value in hastening the training of those who joined the Expeditionary Force without previous military experience. From 1914 until the end of the war, some 8,000 to 9,000 Cadets were annually passed into the Territorial units on reaching the age of 18, and at the conclusion of the war not only was the Territorial Force maintained up to strength but the Cadets had increased to a total of 31,000. With a population of a little over 1,000,000 New Zealand had supplied and kept up to strength an Expeditionary Force in Samoa, France and Egypt, sending abroad for the purpose 100,000 men, while maintaining her home defence force of Territorials and Cadets at full establishment.

After the close of the Great War came the difficulties of finance and consequent cutting down of defence expenditure. In order to meet this, the organization of the Territorial Force was altered and the Permanent Force reduced in numbers. The new organization merged the Canterbury and Otago Military Districts of the South Island into one—the three Districts being now called the Northern Command and the Central Command (North Island) and the Southern Command (South Island). The principle of universal training became limited to the training of all those of Cadet and Territorial age in such centres as the reduced strength of the Instructional Staff could reach, while training in the Territorial Force was reduced by transferring to the Reserve at the age of 21 instead of at 25. The only alteration in the organization of the Cadets was the grouping of companies into battalions.

The basis of the new organization is that the Territorial Force consists of one Division (Infantry) and three Mounted Rifles Brigades, with the proper proportion of Corps and L. of C. troops. In addition to the divisional organization there are also Coast Defence units for the garrison of the defended ports and a Territorial Air Force instructed and administered by a Permanent Air Force Cadre.

In each Command there is a Brigade of Mounted Rifles consisting of 3 M.R. Regiments, an Infantry Brigade (consisting of 4 battalions), a Field Artillery group of 4 F.A. batteries, 2 medium artillery batteries, and, in the case of two Commands, a coast battery and a pack battery. In each Command also there is a Depot of Field Engineers, a Depot of Signals, an Army Service Corps Depot, a Medical Corps Depot and in the Southern Command an Officers' Training Company, N.Z.M.C.

At the close of the financial year of 1928, the strength of the Defence Forces amounted to:—

	Officers.	Other Ranks.
Permanent Force (Administrative and Instructional).....	107	399
Territorial Force	1,069	20,140
Cadets	525 ¹	33,939
Defence Rifle Clubs, 144; Membership, 4,238.		

The New Zealand Defence Forces are commanded by a General Officer Commanding (Major-General). The Staff at General Headquarters consists of:—

- | | |
|-------------------------------------|-------------------------|
| (a) General Staff Branch; | (d) Air Services; |
| (b) Adjutant-General's Branch; | (e) Artillery Services; |
| (c) Quartermaster-General's Branch; | (f) Financial Services. |

Each of the three Commands is under the command of a Colonel (Brigadier) and is divided into four Regimental Districts, each in charge of a Staff Corps Officer.

All Cadet and Territorial units are officered solely by Territorial officers. The Permanent officers provide the instructional and administrative staff, including the adjutants of brigades of artillery, of regiments, of battalions and of depots.

In addition to the obligatory course of instruction laid down for Territorials of 12 drills, 6 half-day parades and 6 days' camp, special courses of instruction for officers and non-commissioned officers are held in each Command, attendance at which is voluntary. These courses are extremely popular and are well attended and go far to make the limited training in the annual camp a success.

Useful and necessary as are the drills and half-day parades, in which the spade work of the training year is done, all keen officers and other ranks look to the annual 6 days' camp. There, after a quick refresher in drill, the greater part of the all too short six days is given to tactical exercises—the platoon, company or battalion in the attack, and outpost and advanced guard work combined wherever possible with other arms.

¹ These are Territorial officers seconded for service with the Cadets.

This year in the Northern Command a notable departure from the usual training in Camp took place, viz.: an exercise in combined operations with the Navy. A battalion was embarked upon the ships of the N.Z. Naval Division, transported by night and landed at dawn in the face of a hostile force. Reconnaissance for the landing force was efficiently carried out by New Zealand Air Force and information satisfactorily transmitted by the dropping of written messages upon the beach.

All officers of the Permanent Force are required to pass the promotion examinations of the British Army. For some years past one officer a year has passed through the Staff College, Camberley, and three junior officers each year have been exchanged with the Indian Army on a two years' tour of duty. Prior to the War, Cadet officers went to the Royal Australian Military College at Duntroon, but since the War cadets have been sent to Woolwich and Sandhurst.

In the years before the War, the Permanent Staff warrant and non-commissioned officer instructors were almost entirely drawn from time-expired warrant officers and non-commissioned officers from the British Army, but since the war, its ranks have been recruited largely from ex-N.Z.E.F. non-commissioned officers. Lately, a number of recruits for the Permanent Staff have been drawn from the Territorial Force and are proving their worth. It is hoped that some scheme may be found whereby non-commissioned officers of the Permanent Staff may be exchanged with non-commissioned officers of regiments of the British Army for a period of duty.

The success of any system of training in this Dominion must depend upon the efficiency of the Permanent personnel. Well trained and experienced officers and non-commissioned officers are absolutely essential as instructors in time of peace and indispensable to provide an efficient cadre, expeditionary or otherwise, in time of war.

For the training of the young Territorial officer there are no O.T.Cs., but the large Secondary Schools (i.e., Public Schools) pride themselves upon the high standard maintained by their Cadet Companies, and it is from the ranks of these Secondary School Companies that the young Territorial officer is coming.

A system of promotion by examination for Territorial officers similar to that of the Regular Army has been in force since 1911, and with the large number of ex-Expeditionary Force officers still serving, the standard of military efficiency is high.

THE PRESENT POSITION OF AIRSHIPS

BY GROUP CAPTAIN P. F. M. FELLOWES, D.S.O., A.D.C., R.A.F.

On Wednesday, 20th February, at 3 p.m.

AIR VICE-MARSHAL SIR VYELL VYVYAN, K.C.B., D.S.O., in the Chair.

THE CHAIRMAN, in introducing the Lecturer, remarked that Group Captain Fellowes was now in command of the Royal Airship Works at Cardington.

LECTURE.

I will preface this lecture with the statement that the opinions I am about to express are personal, and not necessarily those of the Air Ministry.

POLICY.

It is now generally accepted that the development of the airship, like that of the surface ship in the past, should be looked upon as an Imperial interest, and that the airship holds possibilities of not only Imperial but of world-wide significance.

We, as an Empire, can do no more than think and act on these lines, and if we are right in our expectations, then the world is wrong, for except Germany and America no nation is interested at present in airship development on a large scale. I think I may fairly assert that these three nations can claim to be guided on this question by logic and reason. At any rate, the fact that we now take the leading part in airship development is in accord with our traditions. We were one of the first great seafaring nations of the middle ages, and in modern times we were the builders of the first big steamship, while hitherto we have been the primary organizers of world transport. When, in the future, this period of airship development is reviewed, the Germans will be able to say with truth, that they were the real pioneers, but what we can claim is that we were the first nation seriously to endeavour to initiate its development on a fully scientific basis with, at the same time, a definite objective in view.

Our programme, very shortly stated, has been and is to lay out bases within the Empire, which will enable airships to be tried out in such a manner that the business minds of the Empire can satisfy themselves as to their practical usefulness.

WORLD POINT OF VIEW.

There are four nations who can be said to have interested themselves seriously in the development of airships, the Germans, the Italians, the Americans and ourselves. The French and the Japanese have taken but a tentative interest in these craft.

The Germans.—The Germans, who certainly should know most about airships, as they have had some thirty years' experience of them, still believe in them, and, despite financial and other restrictions, have continued to develop them. They have recently, as you know, completed "L.Z.127." Her length is 770 ft., her total lift is 114 tons, her speed is 62 knots cruising and 70 knots full speed, and her range about 7,400 sea miles at cruising speed. With this ship they have carried out the flying which they considered essential to arouse the necessary interest to enable airship construction to be carried on in Germany. I believe it was at one time, and may still be, the intention to charter the ship to a Spanish company for trial flights on a trans-Atlantic route between Seville and Buenos Aires, a distance of 5,350 miles. The plans for her use, however, vary from time to time, and I have read recently that she is to be employed for polar exploration in 1930.

I think it should be mentioned that the accident to the ship which occurred on the flight to America could have been avoided had there been more efficient inspection. An undetected weak spot in the attachments of the fabric gave way and allowed the slip stream to enter the fin, with the result that a large portion of the fabric covering was torn off. I may also affirm that the discomfort said to have been suffered by the passengers on the journey to and from America is much exaggerated, and the German Minister of Communications has told us that motion worth mentioning only occurred for a short time on two occasions, once on the out trip, and once on the return trip, and even then the motion could not be compared with that experienced in a ship in a rough sea.

The Italians.—The Italians, who have consistently adhered to the development of the semi-rigid type, have recently suffered a disaster in the loss of the "Italia." This disaster, coupled with the fact that they have hitherto devoted themselves to the development of the semi-rigid, a type of airship which is limited as to size, has caused them definitely to abandon airships.

The Americans.—The Americans have recovered from the effect of the disaster to the "Shenandoah," and recently initiated a world-wide competition amongst designers, offering a prize for the design of a rigid ship for war purposes, varying between 6,300,000 and 6,600,000 cubic feet, speed $72\frac{1}{2}$ knots, length 785 feet, greatest overall height 155 feet, diameter $137\frac{1}{2}$ feet, to carry four aeroplanes plus machine gun equipment.

In detailing their requirements they have laid down very rigid specifications in regard to the conditions which the ship must be able to meet, both in the air and when moored out, and they have asked for a minimum factor of safety of two and half, except when the worst conditions are super-imposed one upon the other, when they have come down to a factor of safety of two. They have now accepted the tender of the Goodyear Akron Co., and have obtained authority to build two of these ships, but it is understood they will not proceed with the construction of both at the same time. If this is the case, they are unlikely to have the use of these two airships for at least six years from now. It will be seen, therefore, that they are proceeding with determination, if somewhat cautiously, with their airship development. They, like ourselves, see the advantage of building up an airship constructional industry within their own country.

The British.—What is the British Imperial programme? I designedly use the word British and Imperial as more than one government has been in power since the airship programme was initiated, while Canada, South Africa and India have recently joined actively in its support, in so far as the construction of bases is concerned. Further, Australia and New Zealand have also taken certain preliminary steps but are awaiting the result of the trials of the two new airships before embarking on any large expenditure. At the moment, our detailed airship programme is :—

- (1) The construction of two 5,000,000 cubic feet airships of approximately 730 feet length and 130 feet diameter, with a full speed of about 66 knots, and a range in still air, at a cruising speed of 55 knots, of approximately 4,000 sea-miles when carrying a normal pay load.
- (2) The construction of one shed in England and of one shed in India, together with the necessary enlargement of a further shed in England.
- (3) The construction of five mooring tower bases, one at Cardington in England, one at Ismailia in Egypt, one at Karachi in India, one at Montreal in Canada, and one near Durban in South Africa.
- (4) The meteorological analysis and organization of the routes selected to be flown over.
- (5) The preliminary survey of future Imperial routes both in regard to bases and communications and the initiation of meteorological investigations.
- (6) When these preparations are complete, the two ships are intended to be tried out on the Imperial routes with the

definite purpose in view of proving that airships can operate between selected ports with reasonable regularity and safety. It is the present intention to carry out the main experiment on the England—India route.

Great Britain herself has borne the main cost of this experiment so far, but it is fair to ask if she should any longer be expected to continue bearing the whole burden. The question is, can the Dominions be convinced that experimental airship flying carried out over one route—say, for example, that between England and India—is equally to the benefit of them all? If they can appreciate this, which is after all a true statement of fact, then the moment has arrived when all the Dominions could fairly be asked to subscribe to the entire experiment.

If we examine the policies of the three principal airship countries, Germany, America and ourselves, they are all seemingly quite different. But it is possible that they may all have the same end in view, even though they are all following different roads to achieve that end. The apparent difference is, at any rate partially, traceable to their very different geographical circumstances. Germany is, from an airship point of view, a small self-contained area; America is, to all intents and purposes, a large self-contained area; and we, as we all realise, spread over a very widely distributed area.

The Germans, with their one ship, are now endeavouring to interest other countries in airship development, notably Spain and South America, with a view to obtaining orders for airships, and if possible the initiation of German owned airship lines.

The Americans, having spent some time in collecting data, are building naval airships, partly, I think, because they see no other immediate method of developing an airship industry. It is rather a remarkable paradox that America, the leading world advocate of peace, should be building the only war airship. This is probably largely due to their inability to obtain a business backing until large airships have been tried out, but may also be partly because their airship personnel are naval and military rather than civilian, and therefore their natural tendency is to think in terms of war rather than of commercial craft. These two airships could be used to demonstrate commercial possibilities if necessary.

We, owing to the size of our Empire and the necessity of airship bases throughout the area in which we intend to operate airships, even if we were militarily inclined, would be constrained by considerations of the eventual cost of a complete Imperial airship organization to build up our airship development on a commercial rather than a military basis. To equip and maintain sufficient bases throughout our Empire for purely military purposes only would be prohibitively expensive.

Airship bases are, however, not really expensive when compared with the cost of shipping facilities. A mooring tower base, consisting of one mooring tower, gas plant, etc., fully equipped for commercial purposes, would cost approximately £200,000, while a combined shed and one mooring tower base with gas plant, etc., would cost approximately £375,000. Each additional mooring tower will cost approximately £50,000. The mooring tower base corresponds to the ship's harbour without a dock and the shed base corresponds to a harbour with a dock.

I should like to break in here by saying that in meeting the airship personnel of America and Germany, I have been struck by the same quality as exists in our own airship personnel, that is, that they are imbued by a sense of cautious optimism in the future of airships; and that is not because they do not fully realise the difficulties which have still to be investigated and overcome before airships can become commercially successful, but it is because they have absolute confidence that these difficulties are capable of solution. They all realise, however, that time, money and persistence are required, but they all firmly believe in an eventual reward.

AIRSHIPS.

The subject of airships naturally divides itself into four distinct subdivisions; they are Technical Development, Operation, Commercial and Military. I will develop each of these headings very shortly; leaving out of account the non-rigid or semi-rigid types.

Technical Development.—The metal frame rigid airship, as everybody here knows, was initiated in Germany by Count Zeppelin. He commenced to design his first rigid in 1894, and completed it ready for flight in 1900. It is, however, not so well known that Count Zeppelin, even at the end of his career, probably lacked a full theoretical knowledge of the problem with which he was wrestling. It remained for the British, aroused by the accident to "R.38" to the existing state of knowledge, to investigate the whole theory of airship construction and operation on a much broader and more scientific basis between 1921 and 1928.

To the Germans must be given the credit of having built six commercial pre-war airships, which carried nearly 40,000 passengers without accident, and of having completed eighty-eight successful Zeppelins during the war. Nevertheless, it was not until the completion of the investigations following on the accident to "R.38" that it was generally realised that there was nothing approaching a scientific exposition of the problem of designing a ship, strong enough in her hull to resist the conditions normally met in the air or when moored to a mooring tower in varying climatic conditions. As a result of the recommendations of the Airships Panel

of the Aeronautical Research Committee, appointed by the Air Ministry to consider and report as to the steps which should be taken to perfect the methods of the construction of airships, certain essential conditions which airships should fulfil have been laid down and also certain factors of safety have been specified. The result has been that the whole problem of the construction of airships has been attacked on a more truly scientific basis than that employed by the Germans. I think I can best convey my meaning by saying that the Zeppelin type of structure, due to its redundancy, is really not mathematically tractable, whereas the designs of both "R.100" and particularly "R.101" have been deliberately designed in order that they should be so as far as possible.

These two ships, "R.100" and "R.101" are in fact the result of this new move in airship construction, and they have embodied all the lessons of the disasters of the past. Each designer has designed his ship to eradicate or discount the causes of such disasters. I do not propose to compare the two ships, "R.100" and "R.101," technically, because it is really a task beyond my capacity, but I can say with the greatest authority—in so much as I am quoting the technical experts who are investigating the strength of these ships—that these two ships we are building are very much stronger than any ship which has hitherto taken the air, and that they have been designed with a fuller knowledge of the conditions they have to meet than any previous ship.

Furthermore, so far as meteorological investigations enable the aerodynamical stresses to be estimated, I can say with assurance that the hulls of both these ships are built amply strong enough. I will give you a few examples. These ships have been built to stand an enforced rate of rise of 4,000 feet per minute, as compared with 1,000 feet per minute for older ships, a quality which you will no doubt realise introduces very extensive provision for the release of gas and the entrance and exit of air into and from the hull.

Ships have broken away from their mooring towers in the past. Close investigation into possible causes of this fact has been carried out in the last four years, and as a result it has been discovered that the strength of the structure of an airship is governed for one-third of its length by the factors resultant from the stresses induced by mooring at a mooring tower. The ship has been designed to meet these stresses. This had never been done before.

The new ships have been designed to stand a breaking load of 30 tons in any direction at the bow; "R.33" broke away due to a lateral load of less than $4\frac{1}{2}$ tons.

The structure of the ship has been built and protected with a view to its freedom from deterioration, and also in order that the ship may

be trued up into the taut condition of a new ship at any time during its life. This is a novel and highly important feature of the new ships. They have been deliberately built too strong, rather than too weak, in order that they may be tested out in really bad weather without jeopardising the whole experiment.

An interesting point is that the system of bracing allows certain calculated tensions to be set up in the wiring during construction; this makes the ship a true elastic structure, and avoids any racking of the joints. So far as the gasbags and outer cover are concerned, a great advance has not yet been made except for the gas valves in "R.101," which are a novelty and a considerable advance on those which have hitherto been used. The development of a synthetic fabric for gasbag material as a substitute for the expensive gold beater skin is showing favourable progress. Technically, the object of this programme will have been fulfilled if the hulls prove to be fully airworthy.

Operation.—There are a great many factors to be considered under this heading. The first and most important is *economy of effort*.

Airships in the past had to be operated from sheds and comparatively little advance has even now been made in methods of so doing. The Germans have developed a method of partially controlling ships on their entrance and exit from sheds by means of small trollies, which run on rails entering the shed and which are secured to the guys controlling the airship. The airship has, however, to be brought to the ends of the rails by a very large body of men and from this position these trollies act as a definite guide, but do not replace, only supplement, the man power.

It is estimated that it will take between 400 and 700 men to handle the new ships in and out of sheds until a satisfactory mechanical method is developed, and even then it can only be done in winds of about 10—15 m.p.h. in a direction nearly parallel to the direction of the shed. That such a limitation should exist is not surprising, when it is remembered that the lateral or broadside surface of an airship of the size of "R.101" is something like 70,000 square feet, as compared with an end-on surface of 13,000 square feet. At the same time, it must be remembered that this vast object, although it has a mass of 150 tons, has no weight. That is to say, from the control point of view, it is the equivalent of an enormous feather.

This is therefore an obviously uneconomical and inefficient method of handling, and the advantages of the mooring tower with its crew of fourteen men becomes clear.

Other methods of anchoring small airships have been used. They have been temporarily housed in alleyways cut in woods, and they have

lain to temporary wire moorings from the ground, but these would not be satisfactory for commercial use and are only applicable to war conditions or emergencies where high risks have to be accepted.

The mooring tower is of comparatively recent development. In 1921 the airship "R.33" lay at the mooring tower for five months continuously, during which time she proved that airships could moor up in a wind of 30 m.p.h. and lie at a tower in winds of nearly 60 m.p.h. Then there occurred a period of little or no development in this country, though America continued to follow our methods. Since 1925, in which year "R.33" broke away in a wind of 60 m.p.h., considerable development has taken place. Nevertheless, it should be mentioned that although in breaking away she badly damaged herself she was safely brought back. The problem of mooring an airship to a tower prior to this accident had been under examination, but its occurrence undoubtedly tended to stimulate an even closer investigation of the whole problem.

The diagrammatic illustration of the ship at the mooring tower indicates the method of attachment, and how the passengers enter and leave the ship.

In the present programme, mooring tower bases are being erected in England, Egypt, India, Canada, South Africa and various sites have been surveyed in West and East Africa, Ceylon, Cocos Islands, Australia and New Zealand. Until bases throughout the Empire have been set up, it will be impossible to make full use of airships for either commercial or military purposes.

But it is not only bases which are required; until the necessary meteorological arrangements and communication system have been organized, it would be unsafe to operate airships. Therefore the object of the present programme is gradually to bring into being the necessary bases, communications and meteorological organization, so that airships may be operated safely within the Empire.

The importance of the science of meteorology to the operation of airships is impossible to exaggerate. With airships, navigation and meteorology are inseparable.

Not only have the bases to be selected for the local conditions which prevail, but also for the conditions which normally prevail in their approaches. I will give you one instance to illustrate this point. Visualising the map of the world, the obvious route for airships to Australia would appear to be from England—Egypt—India, from thence to Singapore and thence to the North of Australia; but this route is most undesirable from the airship point of view, not only because of the prevailing winds but also because of the thunderstorm belt which is continuous to the North of Australia.

You all know that in certain areas of the world seasonal and prevailing winds are normal. They were the winds used by the old sailing ships, and they will be the winds used by the future spaceship captains. It is interesting to remember that the colonization of the Empire was based on the sailing ship routes, and therefore the prevailing winds were the same as for airships on the Empire routes.

A hand-drawn sketch of a ship's superstructure, likely a bridge or control room area. The drawing shows a multi-level structure with a large windowed section on the left, a central entrance area, and a tall, narrow tower-like structure on the right. Several labels with arrows point to specific parts:

- Main Bridge**: Points to the top horizontal section of the main structure.
- Bridge Deck**: Points to the upper level of the main structure.
- Control Room**: Points to the interior space of the main structure.
- Staircase**: Points to the external staircase leading up to the main structure.
- Radar Mast**: Points to the tall, narrow structure on the right.
- Searchlight**: Points to the light fixture at the top of the radar mast.
- Antenna**: Points to the small rectangular structures on the roof of the main structure.
- Compass**: Points to the circular structure on the roof of the main structure.
- Weather Vane**: Points to the weather instrument on the roof of the main structure.
- Signal Light**: Points to the small square structure on the roof of the main structure.
- Searchlight**: Points to the light fixture on the side of the main structure.
- Antenna**: Points to the small rectangular structures on the side of the main structure.
- Compass**: Points to the circular structure on the side of the main structure.
- Weather Vane**: Points to the weather instrument on the side of the main structure.
- Signal Light**: Points to the small square structure on the side of the main structure.

**METHOD OF ATTACHMENT TO MOORING TOWER,
AND MEANS OF ACCESS TO AIRSHIP**

Similarly, mooring tower bases in the North of Australia would not be as suitable as mooring tower bases in the South of Australia, due to the fact that the area in the North is the hot area. Airships would not only have less lift, but air is more unstable in these areas and also the cover and bags of airships deteriorate more rapidly in hot climates.

You all know that in certain areas of the world seasonal and prevailing winds are normal. They were the winds used by the old sailing captains, and they will be the winds used by the future airship captains. It is interesting to remember that the colonization of the Empire was largely governed by sailing ship routes, and therefore the prevailing winds are in most cases suitable for airships on the Empire routes.

Take the route from the Cape to Australia: the "roaring forties" or Westerlies will help the airship at a high speed from Capetown to Perth, by keeping South. Equally so, the S.E. Trades will help the airship from Perth to the Cape, by keeping North.

I feel I should not leave the operating side without explaining to you that thunderstorms are not the serious matter to rigid airships that they are generally thought to be, in so far as the actual lightning is concerned. Rigid airships have frequently been struck by lightning in the past, and the only known effect has been partially to fuse the metal of the structure at the point of entry of the flash. The cross section of the metal of the structure, which forms a continuous Faraday cage around the whole of the ship, is amply large enough to convey safely the amperage transmitted by a discharge. It is generally agreed that these discharges, and also the gradual change of potential due to alteration of height, etc., are conveyed away through the engine exhaust. How dangerous to airships the vertical currents of air which occur high up in thunderstorms, and line squalls, may be yet remains to be proved, but we believe that we have made ample allowance for them in the structure of the new ship. The experienced airship captain will avoid these up-currents by flying low when in the neighbourhood of these conditions, and will thus avoid high speed vertical currents and also the one real danger in a thunderstorm, which is the necessity to valve gas.

Our meteorological branch have, for several years, been analysing the conditions which have prevailed on the routes on which the airships will first fly, and the airship staff have been carrying out theoretical exercises in flying an airship with similar speed to "R.101" over these routes, utilizing the actual weather conditions which existed in past years; that is to say, in February of this year, in carrying out their exercises, they will assume conditions which actually occurred in Februarys of past years. These exercises are not only providing our airship staff with the same type of experience as that which they will

gain in actual flight, but is also practically teaching them the weather map of the world in the neighbourhood of the routes of the future.

Commercial Considerations.—The first consideration in commerce is of course, profit; but before profit can be achieved, safety, reliability and punctuality have to be demonstrated. A very distinguished authority in the shipping world has told us that airships can, within limits, largely disregard expense, provided they can ensure these three factors: safety, reliability and punctuality, because the great increase of speed which airships will be able to bring about in communications, is of such vital importance. With the ships we are now building, it is anticipated that Egypt will be within two days, India within $4\frac{1}{2}$ days, Australia within 11 days, and New Zealand within 14 days of Great Britain.

What this means to the world it is impossible to foresee, but that it will have a great effect is unquestionable, and it would be an interesting exercise for the imagination to take the existing map of the world's steamship routes, or even railway routes, and endeavour to forecast how much they will be diverted in the future by the effect of, not only airship but also aeroplane, transport.

There are certain commodities in commercial transport, which can afford to pay for fast transport; they are passengers, mails, specie and valuable light freight generally, and it is these very commodities which the airship can conveniently carry.

I was much struck by the point of view of Dominion business men during a recent tour to select airship bases. In their view, the most important service that airships could render the Empire was not that of mail carrying, but that they would enable heads of businesses to meet personally with considerably greater frequency than at present.

The present programme of building two airships is obviously only a very small beginning. These two airships can at most establish certain data for commercial brains to consider. I very much doubt if two airships will be able to obtain sufficient data, because it seems to me that, before commercial organizations can spend the money of their subscribers on airship development, they will have to have a very clear line to go upon, both in regard to reliability and expense. If, say, running these two experimental airships over the route between England and India for one year to a regular, but not very frequent, time table is sufficient to convince the shipping interests that airships are a potentially serious rival, then two airships are probably sufficient; but the mind of the world is very loyal to its old convictions, and I think it will be necessary for airships actually to commence to effect traffic receipts before they can obtain very important business consideration.

Airships are unfortunately somewhat expensive because of their great size, and people are rather apt to think because we have been a long time in producing these airships, that therefore they ought to come out perfect. Naturally, this cannot be so any more than is the case with the first of a new type of motor car.

The expense of their bases I do not think will seriously matter, as it will be so obviously to the interests of the local authorities to erect them that this will not, I think, affect the rate of development of airships. But the expense of the construction and maintenance of the early type of large airship may act as a serious deterrent to commercial organizations at the commencement of their development. This still remains to be seen, but each airship shed designed for the construction of a large airship costs somewhere between £150,000 to £180,000, and there are at present in existence in England only four sheds in which it would be possible to construct a 5,000,000 cubic feet ship, and only two of these are big enough to permit of the operation of airships.

When these two ships commence operations, one of these two sheds will have to be retained as a dock for airships in England. Similarly, the shed in India will also have to be retained for such a purpose. It is therefore clear that there are only, at most, three sheds at present available for airship construction in the Empire, and in only one of these can a ship of over 5,000,000 cubic feet be built.

So far I have not mentioned the Anglo-Canadian route. This route, due to the weather conditions which prevail between England and Canada, requires a larger airship for its operation than the Eastern route. Our analysis of the prevailing weather leads us to believe that a ship to operate this route will have to be of considerably larger size than those now being built. The one shed I have mentioned above would probably be sufficiently large for the construction of such a ship, if some concession in regard to the perfect length/diameter ratio were made.

Surveying the possibilities of the development of airships for commercial purposes in sight at the moment, you will see that there are only five airships, including the two in America, which could be made available for this purpose, and these are split up amongst three nations.

This is a very small basis for a development so full of potentialities. It is in a sense a research problem, and how quickly it will be solved really depends upon the capacity of these first airships to satisfy commercial authorities, such as ship-owners and bankers, of the desirability of pressing forward airship development within the British Empire. If they consider that the airship will develop into a serious competitor to the surface ship in regard to passengers, mails, etc., they would be most unwise to allow other nations to catch up on the start we have

obtained by embarking on the present airship programme. Naturally, sober-minded men, such as the heads of our big shipping organizations undoubtedly are, must have serious proof before they will move; still there can be no doubt that the right people to move when the moment arrives must be the big shipping organizations. They have the experience of handling large craft and they have the office organizations throughout the world to deal with their administration, up-keep, etc.

A business man suggested to me the other day that airships are now in much the same position in regard to steamships as the wireless companies were to the telegraph companies some years ago. We all know who held the trump cards in the recent negotiations for the merging of these two interests, whereas, had the telegraph companies displayed real foresight twenty years ago, they would never have fallen into this unfavourable position. A similar situation between road and railway transport is now arising, and if the shipping companies are to avoid being caught, they will have to watch airship development very carefully. The existing trans-Atlantic rivalry between the big shipping combines and the steps they are taking to save half a day, suggests the importance and the value put upon time in ocean transport.

Military Uses.—In this consideration we leave weather conditions out of account. They must, of course, always affect the operation of airships as they do surface ships, but in view of our greater knowledge of airship design and of the perfection of meteorological arrangements, I think they may be largely discounted. Now, the military uses of airships are, in my opinion, all dependent upon the undoubted vulnerability of the airship. In the last war, before aeroplanes were developed, the Zeppelins were successfully utilized for bombing. Now that not only the aeroplanes, but also the ground organization for locating aeroplanes and airships, listeners, etc., have been so much developed, I believe that the possible use of airships for bombing areas defended by aircraft is suicidal, and can never produce total effects which work out in favour of the attacker, as his constructional efforts and organizations to produce and maintain an airship fleet must always be greater than the total disorganization, etc., occasioned.

But if it is accepted that airships normally will not be used in areas which are controlled by enemy heavier-than-air aircraft, it by no means eliminates the airship for war purposes.

In any war in which we engage, there must be large areas of the world friendly to ourselves, and at present the oceanic areas cannot be regarded as areas under control by aircraft. Therefore, for a large number of communication and reconnaissance purposes, the airship is still a valuable war auxiliary.

It would not be logical to agree that the airship, because of its vulnerability, could not be used for such purposes, when at the same time we face the fact that the merchant ship, an equally vulnerable craft, is vital to our existence in these Islands. Therefore, when airship bases are established throughout the Empire, there is little doubt that the airship will be a most important means of communication in war, for despatches, staff officers, light stores, aircraft transport, and even troop transport.

With regard to the latter, it may come about in the future that the Army will make arrangements whereby the stores for the equipment of troops, etc., will be held in outlying bases, so that the troops to use them can be transferred quickly by light and fast transport. If this is done, the economy in the defence of the Empire may prove to be of great importance, as it would no longer be necessary to maintain such large peace garrisons abroad.

Airships will not normally be used for purely offensive purposes, but there are certain situations in which they could be so used with great effect. These are: the control of merchant ships in war or of territories of inhabitants unarmed with aircraft.

The possibilities of an airship as an aircraft carrier from which aircraft can drop off and hook on again any number of times have yet to be proved under normal service conditions. The actual manoeuvre of hooking on has been successfully achieved both in this country and in America, but the system or apparatus still requires considerable development. There is, however, no difficulty whatever in dropping off in an aeroplane. When the airship carrier comes into being it will largely supplement the surface aircraft carrier, over which it has some considerable advantages.

Airships will probably be able to carry half, or perhaps more, of their total dynamic lift in aircraft when they are used as aircraft carriers. We are not certain yet how much an aircraft will support itself in the air at the normal cruising speed of an airship. When used as an aircraft transport, airships will be able to absorb their full surplus lift in carrying aircraft, and it is conceivable that more aircraft will be able to embark after the airship is in the air.

The difference between the carrying power of an airship as a carrier and as a transport is brought about by the fact that the former cannot valve gas because she has to re-embark her aircraft in the air, whereas the latter can valve gas as she finally gets rid of her aircraft on arrival at her destination. The airship carrier after dropping her aircraft, maintains herself below her pressure height, or height at which she would have to valve gas and so lose lift, by using her dynamic equilibrium

control. That is, she sets her elevators to drive her down. In a ship of the size of "R.101" there will be a dynamic effort of 15-20 tons available at full speed for this purpose.

When the airship carrier and transport has been developed, many uses for such craft will be found, both for defensive and offensive purposes, for Air Force and Naval operations.

It has been suggested that airships will be used as hospital ships. So far as comfort is concerned, there is no reason against this use, but the difficulty of timely recognition under certain weather conditions may prove an insuperable objection.

DISCUSSION.

LIEUTENANT-COMMANDER BROTHERTON, R.N.: The lecturer did not say whether the shed now being built is a revolving shed or not. If it is not a revolving shed one would like to know the reason why—whether it is due to financial or technical difficulties. It is very important that the shed should be a revolving one so that the airship can be taken out when the wind is blowing in any direction. If it is a fixed type of shed, the airship can only be brought out if the wind happens to be blowing in the right direction.

There is another point: One has heard that the lift of these airships is about 50 tons. Presumably, that means 50 tons under the most favourable conditions of barometer, thermometer and humidity. If the lift under the best conditions is 50 tons, can the lecturer give us an idea of what it would be under the worst conditions? I imagine that there would be a large difference.

Again, there must be an enormous amount of turbulence in the rear of the power engines, consequently an enormous amount of drag with the engines running, and I would ask if any method has been devised for measuring and then minimising that drag.

The helium gas which the Americans are using for their military airships is not available to us in this country, and it is important to remember that point because if our airships cannot be filled with non-inflammable gas they are practically worthless from a purely military point of view.

I was much struck in the pictures that were shown by the immense number of vital points in the framework, perhaps 100,000, which would be subject to rust, particularly when the airship is working over the sea. I should like to know if there is any method of examining all those points periodically. Is it possible to do so? Is it necessary to do it, or can the framework be made absolutely and permanently rustproof?

Another point is that during the war we never heard of anybody jumping out of a burning Zeppelin in a parachute, and I imagine it is not possible for that to be done. If an airship is on fire and falling, if a man jumped from the airship in a parachute, might the blazing airship fall on top of him? Would it be possible to carry any kind of life rafts for use in case the airship broke down at sea?

Lastly, in the pictures that were shown this afternoon we noticed that the gas bags were in contact with and separated by the wire bracing across the framework rings. It appeared to me that this vibrating wire bracing would in time cut through the gas bags. I would like to know if that is liable to occur, and if so, how that danger is obviated.

THE LECTURER :

In reply to Lieutenant-Commander Brotherton's very searching questions, I may say that the question of the construction of a revolving shed has not been turned down as a technical impossibility. As a matter of fact, I believe the Americans are considering this question at the present time. Of course, a revolving shed is very much more expensive to build than a fixed shed, and there are various methods of constructing it. You can either support it on the ground or float it. The Americans have thought of making ponds of the same length or twice the length of the shed. With a mooring tower a revolving shed is not necessary. A main feature of the mooring tower is that it enables you to await favourable atmospheric conditions before attempting to put the airship into the shed, and then there is no difficulty in doing so. Lieutenant-Commander Brotherton asked a question with regard to the useful lift of these airships. As he suggests, the lift varies considerably under different conditions. For instance, you would not be able to carry as much in India as in England, because the climate is hotter in the former. The lift of an airship is governed by the weights of air displaced by the cubic capacity of the gas bags; it must, therefore, vary according to the conditions of barometric pressure, temperature, and humidity. There are other factors which affect the lift of an airship, such as the difference of temperature between the air and gas, known as super-heat, but experience has shown that all these variations can be successfully dealt with in practice.

We all know, of course, that airships have flown successfully for very long distances, in all sorts of climatic conditions. I am afraid I cannot give Lieutenant-Commander Brotherton an exact figure of how much the lift would vary for any selected set of differing conditions. A figure I have in mind is that one degree of super-heat makes a variation of about one-third of a ton in the big ships that are being built now, but in any case, as I have just said, conditions do not vary in such a way as to make the airship an impracticable proposition.

As to the drag of the power bodies; it is a disputed point at the present moment as to how much the drag of the power bodies is added to by the turbulence caused by the rotation of the propellers, and also as to how much this turbulence adds to the drag of the airship itself. It is said that if you have all your engines right aft you will be able to reduce the drag due to turbulence very much indeed, but whether that is actually so we do not know. We shall find out shortly, but at the moment we have no opportunity other than the National Physical Laboratory small scale method of testing out the drag of power bodies.

Then about helium: I think there is no need to be gloomy about the possibility of obtaining helium in this country. We have good reason to believe that there is more helium available in the United States than they can use, and there is always the possibility of finding it in Canada in useful quantities. A distinguished American official who was over here not long ago in connection with air matters, said there was a possibility that in a few years time America would be considering the question of allowing other nations to purchase helium, but naturally he could not give any date when that would occur. So far we have not found helium in the British Empire in profitable quantities, but we are still searching for it. Even so, I do not agree that an airship is useless, either for peace or war, if she is lifted by hydrogen. In peace, in an airship equipped with heavy oil engines and lifted by hydrogen, with proper care, it should be possible for practical purposes to do away with fire risks because where the hydrogen is situated, that is in the upper part of the ship, there is nothing which causes a fire, and in the lower part of the ship the fuel used is non-inflammable below a

temperature of 210° . It is true, however, that a helium-filled heavy-oil ship would inspire greater confidence in a nervous passenger. In war a hydrogen-filled airship would be most useful, for a number of purposes, in areas which are friendly to ourselves. If you visualize the world in the case of war, you will at once realize that probably we will be controlling the oceans, anyhow to a very large extent, and there will be enormous areas of the world friendly to us. In those areas there is little danger to an airship, and within them she can be used for many transport, escort, and reconnaissance duties. The airship personnel would be quite prepared to take the chance of coming across an odd hostile ship at sea and being shot at by anti-aircraft guns, or of being attacked by aircraft carried by that hostile ship. The airships themselves will carry aircraft in the future. It is really an economic proposition whether it will be worth while to build airships for these purposes, and we really cannot pronounce definitely on the question until after the next war, which I am sure we all trust will not take place.

With regard to the question of inspecting these airships for rust and deterioration, all modern airships are anodically oxidised or varnished when they are built. They are also treated with lanoline. Both "R.100" and "R.101" have been treated in this way. It is possible to inspect an airship very quickly indeed for deterioration because the whole of the frame is clearly visible. When the gas bags are inflated it is not so easy but it is still possible; when she is deflated she can be inspected very easily indeed. A thorough inspection of an airship for deterioration need not take more than three days. In any case, it has been found that the surface deterioration of duralumin does not appreciably affect its strength. It has also been found that it takes a long time to deteriorate properly protected duralumin, and this will hold good even in bad climates like that of Karachi. We have tested the material with salt sprays and we have found that it stands up against such treatment for a long period.

With regard to the question of parachutes, I do not know why the Germans were not always provided with them. They were sometimes so provided. We carry parachutes in airships as part of their normal equipment, and there is no difficulty in dropping out of an airship in a parachute. It has been done. There is a modern form of parachute in which you can drop two or three thousand feet or more before you open it, and there is therefore no reason why, if an airship were set on fire in war, that it should fall on you. In peace, the question should not arise; the bogie of fire in an airship under peace conditions has been tremendously exaggerated. In the spaces where hydrogen gas is likely to be there are no electric leads, and you must remember that when hydrogen gas is released from a bag it immediately goes out of the top of the airship. The only serious source of danger of fire in the past has been from petrol, and we are, by developing heavy oil engines, making great efforts to get rid of that. Petrol is dangerous because it gives off a heavy vapour at comparatively low temperatures, which lies in the bottom of the ship, but even then it is very difficult to induce an explosion of petrol and air. It is only a very small percentage range of mixture which is dangerous.

As to the provision of life rafts, I do not think those are necessary in an airship. It is practically unknown for a gas bag to have failed in an airship, and even so the ships would not have to descend on the sea. As far as power plant is concerned a large airship has five engines at least, and if one fails she can go on quite happily with the other four, and could, of course, fly on one alone. There is, therefore, no reason to think that an airship will ever have to descend on the sea, unless she has been injured by gunfire or something of that sort.

Lieutenant-Commander Brotherton also suggested that the wire mesh containing the gas bags might cut through the gas bag. As a matter of fact, the

interior of an airship is without draughts to make the gas bags flutter, and there is no vibration to cause other movement, also the gas bags press tightly against one another, so that there is no tendency for the gas bags to rub one against another. It is conceivable that if an airship were to pitch heavily, a tendency to move might occur, but in practice the trouble he suggests does not occur. Bags have had tears made in them and repaired during inflation, but this only happened in the early ships, and I have no reason to think that it will happen in modern ships.

THE CHAIRMAN :

Speaking from personal experience of trips of thirty hours' duration, I can say that an airship is the most comfortable form of conveyance that can be imagined. There is a little motion at times but never very much, certainly nothing like as much motion as in a ship at sea.

The question was raised of the use of parachutes by the crews of airships in case of necessity. In the "R.38" two men jumped out in parachutes and were lost, but in that case I think the ship was flying too low. The men fell in the Humber and theirs were the only two bodies we did not recover. I think the reason was the very strong tide and also that the men got anchored down to the bottom in the silt of the river. I feel that airships possess enormous advantages. Science is helping us more and more in their construction. It is only a question of time, before they prove to be one of the most wonderful methods of communication between different parts of the Empire.

The customary votes of thanks to the Lecturer and to the Chairman were put to the meeting and carried by acclamation.

FUEL GAS AND HELIUM FOR AIRSHIPS

(The following is an extract from an article on "Airship Progress and Airship Problems" by Commander Garland Fulton, U.S.N., published in the "Journal of the American Society of Naval Engineers," February, 1929).

THE recent development and use in Germany of a fuel gas in lieu of the customary gasoline is an interesting, possibly important, event in airship progress, and the success of the venture will be watched with great interest.

The idea itself is many years old. There is no particular difficulty about burning almost any hydrocarbon gas in the ordinary gasoline engine. To the Germans, however, belongs the credit of developing practical gas burning appliances adaptable to their engines and embodying changes in interior arrangements on the airship to permit the fuel gas to be carried.

The endurance of an airship is increased by burning a fuel gas in combination with gasoline. This increase may amount to as much as 40 per cent. or more, depending upon conditions. It is still a little puzzling why, with hydrogen already available in the airship, the Germans did not burn that gas in preference to valving it as the ship became lighter through consumption of liquid fuel. Hydrogen has been burned successfully in airship engines. Possible reasons for not adopting this procedure are, greater fire risk, more complicated combustion problems for the engine and more complicated operating technique. In adopting, as they did, a fuel gas of density approximating that of air, the Germans apparently had uppermost in their minds, besides the increase in airship endurance, the simplification in airship operation that would follow through leaving the equilibrium of the airship practically undisturbed as fuel is consumed, thus obviating the necessity, as under the old scheme, of shifting load to maintain the airship in proper trim or of valving hydrogen as the airship became "light." Note here that water-recovery is another answer to this problem.

An advantage advanced for fuel gas over hydrogen is that the range of explosibility of gas and air mixtures is less with fuel gas than with hydrogen. Thus the explosibility of hydrogen mixed with air has a lower limit of 4 and an upper limit of 74—or a range of 70; whereas a

typical fuel gas might have a lower limit of 3 and an upper limit of 15—or a range of only 12. Thus the range of explosibility for the fuel gas is about one-sixth that of hydrogen and it is therefore safer.

After experimentation with numerous gases and after considering density, heating values, condensation point, and possible deleterious effects on engines and fabric of the containing cells, the Germans chose as best for their purpose a modified "blaugas"—so-called after Dr. Blau, originator of the process. The gas is made by an oil cracking process and it was considered expedient to erect a special plant near the airship shed for manufacture of the gas. This was a prudent move because while the gas is not expensive at its source, it becomes very expensive if it must be compressed and transported. Some difficulties were experienced with the operation of this fuel gas plant which resulted in delays in the "Graf Zeppelin's" arrival in the United States. Difficulties are likely to be encountered in drawing off a uniform gas from a container of "blaugas" since the gas is made up of a number of constituents and is consequently not stable.

Several months ago the Bureau of Aeronautics was requested to locate in this country a gas having the required characteristics in order to replenish the "Graf Zeppelin's" fuel on her arrival in America. Our first efforts were abortive, because we tried to locate a "blaugas" duplicating that planned for use in Germany. Several "blaugas" samples were procured but they were unstable, uncertain and unsatisfactory. We turned then to the recently created and rapidly growing natural gas industry in the United States, and there found a satisfactory, and cheaper substitute gas—virtually a vaporized gasoline. The methane-ethane-propane series is being extensively processed for industrial uses at various points and offers attractive possibilities as a source of "fuel gas" for airships in future. Indeed, ethane has a density of 1.03 and other characteristics that are satisfactory. Commercially pure ethane would serve nicely but was found to be expensive. In one town in Oklahoma citizens are burning in their stoves, at a price of fifty cents a thousand, just the sort of gas that is required.

While cheap at its source (and cheaper here than in Germany), a fuel gas will prove expensive if it must be compressed and transported. Going to the heavier gases in the series, as propane, density 1.5, we have a gas that may be "shipped as liquid; burned as gas." This results in a tremendous saving. The airship could burn a gas of density 1.5, but would lose some of the desirable results that follow from a density of around 1.0. However, propane can be diluted with hydrogen, or coal gas, procured near the airship base, to bring the mixture to the desired density, and thus save considerably in transportation costs. If we are

ever to adopt the use of fuel gas in our airships, these and similar questions must be looked into carefully and the best solution found. One thing is certain, however, there will be no difficulty in finding a satisfactory and cheap fuel gas from among the wide variety of natural gases available in the United States.

On first glance it would appear that a combination of helium as a lifting gas together with a fuel gas would be an ideal combination. The increase in airship endurance and the smaller quantity of high priced helium that is necessary are attractive. The combination should prove economical. However, complications, particularly as to interior arrangement, are involved. It is too soon after the first real use of fuel gas in airships to form final opinions as to the merits of the scheme. The expected introduction of oil burning engines may change ideas with reference to the utility of the fuel gas scheme. For commercial operation of airships, it does appear that a combination of helium, fuel gas and a small amount of water recovery apparatus would prove to be the most economical combination available at the present time.

HELIUM.

Helium, as we all know, exists in certain natural gases in the United States. The helium content varies from a small fraction up to around two per cent. and it is profitable to extract this helium if it exceeds about 5/10ths of one per cent. The method of extracting the helium from the natural gas will depend upon the physical properties of the constituent gases. The general basis of methods used for both extraction and purification of helium is the low liquifying temperature of helium compared with the various other gases.

In the past airship operations have been handicapped by insufficient supplies of helium, but since a year ago we have been able to obtain an adequate supply for operations and are gradually accumulating the quantity that must be available when the two new airships now under construction are ready to be inflated. There is no shortage in the natural supply of helium. From reliable geologic reports, it is well established that from one field alone twenty million cubic feet or more of helium per annum can be extracted for the next fifty years—and this without touching the so-called Helium Reserve set aside in Utah. The Bureau of Mines, Department of Commerce, as the Governmental agency now charged with helium conservation and development is about to enter and establish a plant in a virgin field, where the quantity of helium available is enormous.

Aside from the Government's production of helium, the matter has attracted interest from commercial firms. A little over a year ago, the

Navy Department was approached by a firm with a definite proposition to sell helium on the same basis as any other commodity. A contract was made and in six months this firm had erected a plant and was producing helium at a price somewhat less than that obtaining in the Government plant. It is pointed out, however, that this rapid establishment of a plant and commercial production of helium could not have occurred had it not been for the pioneer work of the Government in helium production.

There is growing up in this country a moderate demand for helium in various lines of activity. Some 200,000 cubic feet is used annually for other than aeronautical purposes. It plays a useful and important role in the treatment of "bends" from which divers sometimes suffer; it is used for various medical and other scientific researches; some is used in radio tubes; in housings for high speed gyros; and a considerable quantity is used in toy balloons.

When production of helium first started, seven years ago, the costs were high. Eliminating the very high experimental cost of the first few thousand cubic feet, we can say the first helium produced in quantity (1921) cost approximately 25 cents per cubic foot. Costs have now been brought to around 3.5 cents per cubic foot. They have gone as low as 2.4 cents at one period. There is every prospect that in a very short time—say one to two years—the cost of helium will be around 2.0 cents per cubic foot.

Helium as a lifting gas for airships has both advantages and disadvantages. It is probably significant that those who are loudest in disclaiming helium are those who do not have access to a supply of the gas. A case can be made on economic grounds alone that helium operation of airships, despite repurification costs, transportation costs and storage costs, is about on a par with hydrogen operation. Needless to say, without water recovery apparatus (or possibly the partial use of fuel gas) such a favourable comparison would not be attainable.

Helium does cause an important reduction in cruising range, due to the fact that its "lift" is less than hydrogen and this reduction in lift cuts down the only reducible item in the airship's loading schedule, viz., fuel. *The range of a helium airship may be 30-40 per cent. less than that of a corresponding ship filled with hydrogen.* If we reject the possibility of using fuel gas, comparative figures become more difficult and confusing, but it is clear that using helium and hydrogen in corresponding ways, the helium airship will have a smaller range. It is the price we pay for safety. Helium forces us to use water recovery, but as pointed out, this complication has some important compensating advantages. Helium involves a modified and more difficult technique of airship

operation. The desire to economise on helium has made it imperative to keep a more careful check on gas losses. Losses that escaped unnoticed under hydrogen operation must be carefully analysed and efforts made to reduce them.

From time to time helium must be re-purified. This necessitates a re-purification plant at the airship station, and the costs of re-purification and the helium losses incident thereto, must be reckoned with. These re-purification costs have in the past run somewhat under a half-cent per cubic foot. How often re-purification is necessary will depend on circumstances, but it will be found profitable to re-purify before the purity falls to 85 per cent., and this will require a complete re-purification probably every four to eight months. It should be noted in this connection that helium seldom, if ever, is available at 100 per cent. purity. The maximum purity that can be realized practically in the airship is of the order of 95 per cent. for a freshly "re-purified" airship.

HELIUM TRANSPORTATION.

After helium has been produced its transportation and storage become problems of the first magnitude. The normal method of shipping gases of similar character has been in steel cylinders or bottles of 2,600 cubic inch water volume size. These cylinders hold about 176 cubic feet of helium at 1,800 pounds pressure. Each cylinder weighs about 120 pounds, and approximately six hundred (containing about 100,000 cubic feet of helium) can be loaded into an ordinary box car for shipment, making a car load shipment weighing some 40 tons. On this the freight charges from Texas to the Eastern seaboard may amount to \$1,200, or \$12 per thousand cubic feet of helium. Besides this the empty cylinders must be returned, involving a freight charge of about \$600 per car load.

Enormous quantities of these steel cylinders were purchased by the Army and Navy for war purposes. A number of them have been fitted with double seated valves in lieu of the ordinary single seated valve in effort to cut down leakage losses, and when so equipped have perforce been used for shipping helium. However, this method is strikingly uneconomical.

In the effort to reduce transportation costs both in freight charges and in handling charges at either terminal, there was developed several years ago by the Navy Department, a tank car which would transport approximately 200,000 cubic feet of helium at 2,000 pounds pressure. Aside from the saving in labour of loading and unloading the small cylinders, the tank car is given far more favourable freight rates loaded, while for return in empty condition there is no freight charge. Upkeep

costs on the car have not been appreciable. By the use of such cars the inclusive freight cost of transporting helium from Texas to Lakehurst is cut to less than \$4 per thousand cubic feet, as compared with about \$18 per thousand by the small cylinder method.

The type of tank car that is now in service comprises three large cylinders about four and one-half feet in diameter by about thirty-nine feet long. Each cylinder is equipped with valves and safety devices. The cylinders are so large they must be made by a forging process which is costly and is a process only a few concerns are equipped to handle. The result is a car that is satisfactory and economical in operation, but which is enormously expensive as to first cost. The three cars of the type in existence, one owned by the Navy and two by the Army, have cost in the neighbourhood of \$98,000 each.

A study was undertaken to determine whether it was not possible to produce a car equally satisfactory and at a much lower first cost. As a result a design has been worked out for a tank car which uses about thirty seamless drawn pipes of moderate diameter instead of three large cylinders. The mounting of these pipes in a manner that will stand rough freight service was a problem, but it has been solved with the result that the new type of car will weigh only slightly more than the three-cylinder type and will transport the same quantity of helium. The first of these new type cars is under construction at a cost slightly under \$60,000 and there is good prospect that future orders can be placed at a lower figure.

Firms that produce welded steel products of comparable nature and size have been interested in the problem and there is hope that in the near future a satisfactory type of welded steel cylinder will be available to help in still further reducing tank car costs. As yet the Bureau of Explosives has not sanctioned the use of a welded container for high pressures, but with the rapid strides being taken in perfecting welding processes, it is to be hoped that approval will eventually be given to welded construction for transportable containers for helium if not for other gases.

These helium tank cars will serve for both helium transport and storage. They very greatly increase the mobility of the helium supply. The saving in freight costs alone will pay for a car in a few months. Besides, there is the very large saving in handling charges at each end.

HELIUM STORAGE.

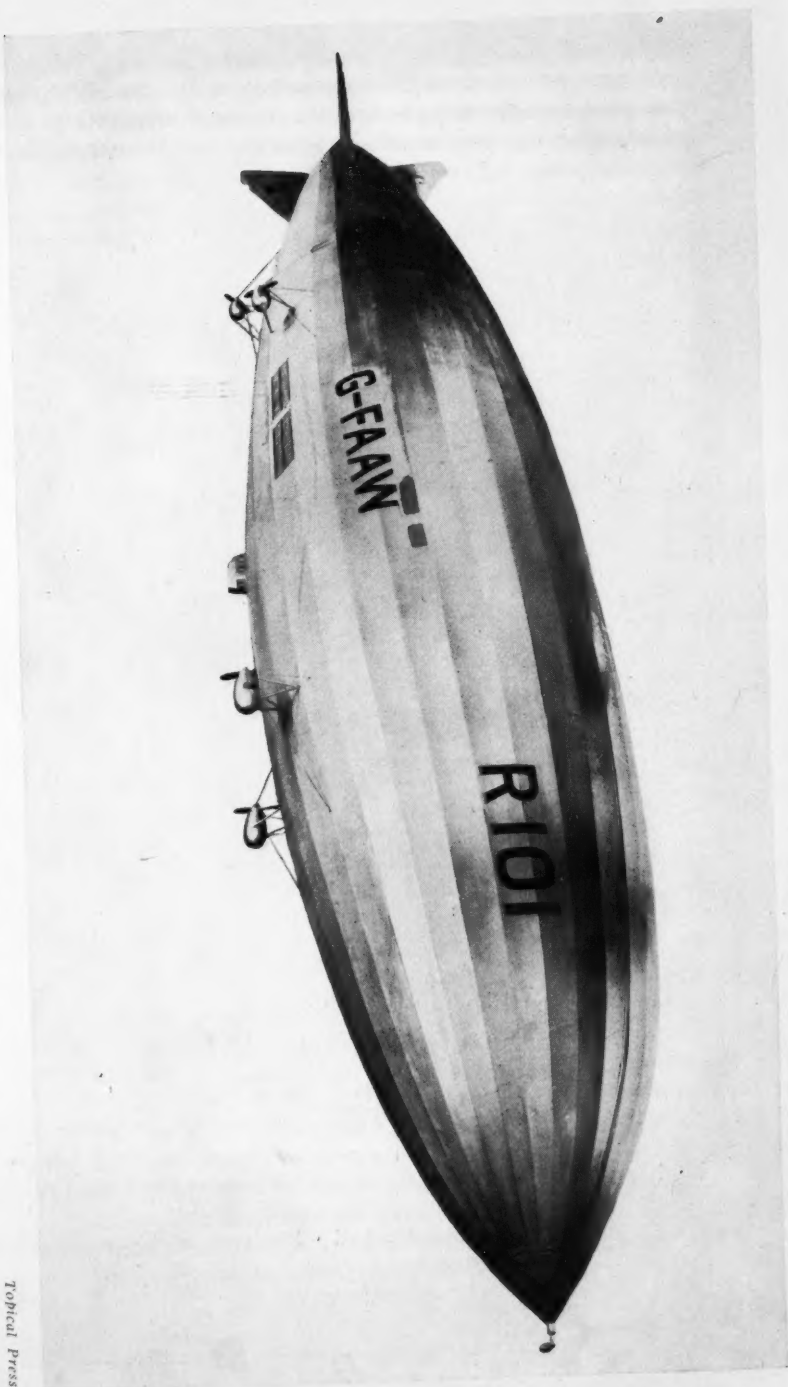
Since helium is not a manufactured product and since it is desirable and economical to operate the helium production plants at a steady rate

we are confronted with a helium storage problem. Were we able to produce quantities of helium as needed, it might prove feasible to leave the natural gas containing its one or two per cent. helium in the ground, drawing on it only as needed. To as large a degree as practicable, this is being done, but there must be on hand at each airship station a reserve supply of helium. How large this reserve supply should be is at present a matter of judgment. A storage capacity at least equal to the volume of airships operating from a given station is desirable. The question then becomes, what is the best form for this storage capacity; gas holders or gasometers of the ordinary city type; high pressure containers (above 120 atmospheres); or moderate pressure containers (around 20 atmospheres)?

It is convenient to have a certain amount of gas holder space available, but in general it is to be regarded in the nature of temporary storage for impure gas before repurification; and to serve as a reservoir facilitating the operation of gassing the airship. At least two such gas holders, each equal to, or larger than, the largest gas cell in the airship, are desirable. The remainder of the storage space can very well be containers for holding the gas under pressure.

HELIUM LOSSES.

Helium losses occur in several ways. There is a loss in transportation; there is a loss whenever helium lies in storage in containers; there is a loss whenever helium is re-purified; there is a loss by diffusion when helium is in use in airships. There is a loss, or expenditure, whenever in course of operation it is necessary to valve helium. There are occasional accidental losses which it appears impossible entirely to eliminate. Based on past experience, it has been estimated that operating a rigid airship of the "Los Angeles" type will require one to one and one-half ship-volumes per year. This, however, depends upon the condition of the gas cells. With good gas cells it will be less. It is difficult to estimate how large the losses on account of gas cells (i.e., diffusion losses) will be, but they will amount to approximately 60 per cent. of the ship volume per annum, and an estimate of 5 per cent. per month should be reasonable. Transportation loss is small, about 1 per cent., and this includes some inevitable discrepancies in delivery and reception data and records. Storage losses, depending upon the type of container in which stored, will be about $\frac{1}{2}$ to 1 per cent. per month. Re-purification loss is 7 per cent. to 10 per cent. of the impure gas supplied for re-purification. The operating loss through valving is impossible to estimate in advance, but it is a small figure. Accidental losses have been very small in the past—not over 2 per cent. per annum.



By courtesy of the Air Ministry.

**H.M. AIRSHIP "R.101"
FROM A MODEL**

Topical Press.



Alfred Picture Service.

THE FLEET AIR ARM
A BLACKBURN DART LEAVING H.M.S. "FURIOUS"

THE FLEET FLAGSHIP—BATTLESHIP OR AIRCRAFT CARRIER ?

By LIEUTENANT A. M. KIMMINS, R.N.

"From the centre the admiral has the extremities of his fleet equally visible, as it may be. At the head he enforces his orders by the force of his example. The French toward the end of this war (1778) solved the question by taking him out of the line altogether and putting him on board a frigate, for the avowed reasons that he could thus better see the movements of his fleet and of the enemy without being blinded by smoke or distracted by the occurrences on board his own ship, and that his signals could better be seen. This position, resembling somewhat that of a general on shore, being remote from personal risk, was also assumed by Lord Howe in 1778; but both that officer and the French abandoned the practice later."

The Influence of Sea Power upon History.—MAHAN.

IT is not the intention of this article to criticize the actions of Lord Howe and of the French in abandoning the practice of placing the admiral in a vessel outside the line, but rather to consider whether they would have been justified in doing so to-day under modern conditions.

The principal wish of an admiral in action is to be in that position which is the most favourable for controlling his own fleet and also for studying the movements of the enemy. The common practice in the days of broadside sailing ships, except during a general chase, was for the admiral to be in the centre of the line. Under existing conditions this was probably the most suitable position, although Nelson and Collingwood both led their columns at Trafalgar. They were probably, however, greatly influenced by their ardour for battle and by the thought of the tremendous moral effect which their position would have upon the remainder of the fleet. The sight of the "Victory," sailing into battle with her yards crammed and halyards bedecked with the Admiral's famous signal, must indeed have been an inspiring one, and one which must have brought courage and fortitude to many a quaking heart.

Nowadays, however, an admiral is not so fortunately placed, for he has by force of circumstances lost most of that romantic position of visible figurehead, with which he was previously regarded by those under his command. To-day, Lord Nelson's "England expects" would have to be conveyed by wireless and later by loud speaker or telephone to the various individuals of his command. Except for a chosen few, the remainder, locked in their watertight compartments, would in all probability not only be unaware of the admiral's position in the line, but also extremely vague about the position of their own ship. The fact, therefore, that he was leading them into battle would make little or no impression upon the general morale of the ships companies. The simple-minded powder monkey of almost childlike faith and confidence in his superiors has disappeared, and has been replaced by an educated and quick thinking individual, concentrating on the delicate piece of mechanism which it is his duty to manipulate. The necessity for a high standard of morale remains, of course, as much as ever, but nowadays it is induced in a different form.

What must influence the modern admiral far more is the question of the position from which he can best control his fleet and at the same time observe the enemy. In sailing ship days the main part of a fleet action was generally fought inside an area of a comparatively few square miles, and it was possible for the admiral, from his position in the centre of the line, to obtain a very useful view of the situation.

Nowadays, however, a naval engagement takes place within an area of hundreds of square miles, and probably a large number of his own fleet and certainly the majority of the enemy's are far beyond his visual horizon. Although science, by introducing steam machinery and guns with great range, has robbed the admiral of most of the benefits which he would have derived from good eyesight, it has compensated him for this loss by providing him with a vastly increased range of vision through the medium of his aircraft. The main principle, therefore, is the same, and it only remains to be decided where, under conditions of modern warfare, is the most suitable place for the Commander-in-Chief to receive, consider, and act upon the information, by which his aircraft and other units will keep him in touch with the situation.

The main arguments in favour of the admiral being in a ship of the line appear to be :—

- (1) The moral effect of his presence.
- (2) The fact that, by being in the thick of the fray, he personally can see as much as possible of the progress of the action.

(3) The closer he is to the remainder of his fleet, the easier will it be for him to communicate with them by visual means.

(1) and (2) can be disregarded for, as has been previously pointed out, modern science has rendered them valueless. (3) cannot be entirely disregarded for, in the event of wireless breakdowns, etc., the more that the admiral is in the centre of his fleet, the easier will it be for him to control them. On the other hand, as was proved by the classic example of the Fifth Battle Squadron at Jutland, funnel smoke, smoke screens, etc., make visual signalling an extremely doubtful means of communication. In the next fleet action there will also be aircraft smoke curtains, and enemy fighters attacking the bridges, with which to contend. It is possible that inter-ship communication will be maintained, but it is extremely doubtful whether inter-squadron visual signalling will be a feasible proposition. In the early stages of the action it may be possible, but once the fleets are joined, it is almost certain to become hopelessly unreliable.

The main arguments against the admiral being in a ship of the line appear to be :—

- (1) The shattering noise and confusion in a modern battleship in action must be indescribably disconcerting to a man who is endeavouring to concentrate on, consider, and follow every movement of the units of both his own and the enemy's fleet.
- (2) By being in a ship of the line, the admiral places himself in the thick of the fray, and therefore exposes himself to the maximum amount of enemy gunfire with little more apparent justification than a general would have, were he to establish his G.H.Q. in the front line trenches.
- (3) In the event of the flagship being damaged by enemy gunfire or torpedoes, not only is the whole line thrown into comparative confusion, but certain units must be rendered temporarily ineffective while the flag is being shifted.
- (4) By being in a ship of the line, the admiral is almost certain to be out of visual touch with his carriers. He has to rely therefore on wireless for communication with his aircraft. The advantages and added security given by an occasional personal report are pointed out later in this article.

If the above main arguments for and against the flagship being a ship of the line are approximately correct, and there is no outstanding advantage which has been overlooked, it only remains to decide what class of ship outside the line is the most suitable to carry the Commander-in-Chief and his staff. The fourth disadvantage to the line flagship seems to provide an obvious solution in the aircraft carrier.

Any plotting room, in which the admiral and his staff are going to operate, must be roomy, quiet, free from local distractions, and must have easy egress to the fore bridge. The plotting room of an aircraft carrier satisfies all these requirements. In contrast to the battleship plotting room, the size of which is strictly limited by that of the fore superstructure, the carrier plotting room, being below the flying deck, can, if necessary, and without interfering with the flying efficiency of the ship, be extended across the entire beam. The admiral and his immediate staff will never require such a large room in which to work, but the advantages of being able to have his decoding offices, etc., so close to him must be obvious.

The plotting room of an aircraft carrier is also one of the quietest places which it is possible to find in the main fleet during action. The noise made by machines taking off and landing is hardly noticeable, while the calibre of the guns is so small in comparison with the size of the vessel that their effect is almost negligible.

The fore bridge, in a carrier of the "Furious" class, is also extremely accessible from the plotting room. There are no ladders to compete with, while the distance is but a few yards and completely sheltered. Admittedly the fore bridge of a battleship is roomier, but as the admiral will spend the far greater proportion of his time in the plotting room, this is of minor importance. In any case, should the admiral wish to take a personal glance at the situation, he can, during moments when the ship is not under enemy gunfire or actually operating aircraft, obtain from the flying deck an unrestricted view in every direction.

It would appear, therefore, that an aircraft carrier would be distinctly preferable to a capital ship from the point of view of controlling a fleet in comfort, quiet, and with a minimum of local disturbances. This in itself is a great argument in favour of the carrier flagship, but there are other and even stronger arguments, which suggest themselves.

Firstly, let us consider the question of the personal safety of the Commander-in-Chief in a carrier. The fact that the modern naval action is fought over such an enormous area makes it more important than ever that every possible means should be employed to safeguard his life. In Lord Nelson's day the captain of nearly every ship was watching the progress of the entire action, and, in the event of the admiral's death, it was a comparatively easy matter for the second in command to step into his shoes with a complete knowledge of the situation.

Nowadays, however, it is quite a different matter. The action is spread out over hundreds of square miles and constantly changing with tremendous rapidity, so that in the event of the loss of the admiral and

his staff, his second in command, although familiar with the situation in his immediate vicinity, will, in all probability, be extremely vague as to the movements of his outlying vessels and aircraft.

There is not sufficient space in this article to consider in detail the most suitable place for the aircraft carrier flagship, but, wherever she is outside the line, she must surely be in a less hazardous position than that of a ship in the line and consequent thick of the fray, presuming, of course, that adequate precautions have been taken to defend her against aircraft and submarine attack.

Even in the event of the flagship being struck by torpedoes or shells, it is unlikely, owing to the absence of large magazines, etc., that the danger of sinking will be imminent. If it is found necessary, however, to shift the flag, it will be a far easier matter and one accompanied by far less confusion to the fleet in general than in shifting from one ship of the line to another. If deck flying is possible the admiral and his staff could be transported to another carrier in a matter of a few minutes, or, should the deck be out of action, seaplanes would possibly offer the solution. In the event of neither being practicable, the situation is little worse than in the case of a ship of the line.

The last and perhaps most important consideration with which it is proposed to deal briefly in this article is the advantage to the Commander-in-Chief of being in personal touch with his aircraft.

In recent peace-time exercises aircraft reports from reconnaissance machines have proved of the greatest value to the admiral, but even in peace time there have been many occasions when some important piece of information has failed to reach its destination or, perhaps even worse, has been mutilated during its passage. How much more likely then is this to happen in war time with enemy wireless interference and the general chaos of battle to compete with.

Imagine for a moment such a situation as that of a reconnaissance machine with urgent news of enemy reinforcements, a flanking movement, or approaching aircraft torpedo attack; its aerial has been shot away; its own carrier, busy flying off machines, is probably out of visual touch with the flagship, or, perhaps even is crippled. In a case like this, where every second counts, the dropping of a message bag on the deck of the flagship, or perhaps a quick landing and personal report might quite easily save the situation.

And again if during the action the admiral is faced with two conflicting reports or is doubtful of the situation in a certain area, he can at any moment send off a member of his staff, who knows the information required, to view the situation and return in a short space of time with

the reliable account of an eye witness. Surely the value of personal reports like these of reliable staff officers, who know exactly what is in the admiral's mind and therefore can bring him the exact information he requires, must form an almost overpowering argument in favour of the carrier flagship.

Before concluding this article a few suggestions as to what would probably be the most suitable type of carrier and the types of aircraft which she should carry, might not be out of place.

She should preferably be a small carrier of about the size of the "Hermes," and should be employed entirely in operating the Commander-in-Chief's personal aircraft. While the main fleet carriers, if the wind is adverse, would, in all probability, find themselves during certain stages of the action many miles from the main fleet, it is obviously desirable that the admiral should keep as close as possible in order to obtain a maximum value from his personal view of the situation.

The aircraft in the flagship should be composed mainly of action observation machines with perhaps one flight of fighters. The former, which would be making periodical short flights, should have as slow a landing speed as possible, or perhaps be built on the Auto-giro principle. If this plan were adopted, the flagship's movements would be almost unaffected by her flying operations. The fighters would be carried in order to fend off enemy air torpedo attack, etc., and would be used in an emergency only. Should no suitable opportunity arise for them to land on their own parent ship, they would have to make use of one of the other carriers.

GROUND AND MECHANIZED FORCES

BY CAPTAIN F. A. S. CLARKE, D.S.O., *p.s.c.*

*We cannot choose a theatre of war like a piece of merchandise
from amongst several patterns.—(Clausewitz).*

EACH advance in mechanization, or rumour of a new experimental formation, is hailed by enthusiasts as the dawn of the millenium, and startling comparisons are made between the supposed powers of this or that experimental formation and those of an ordinary marching brigade. But all these enthusiasts and writers usually remain silent on the maintenance problem, which seems to be considered as a mere part of the deadening routine of the reactionary soldier, while the possible action of the opponent is usually overlooked. Lastly, no attention ever seems to be paid to the effect of terrain.

Yet one of the lessons learned from our Experimental Armoured Force is that such formations are peculiarly susceptible to ground ; and it is noteworthy that this experience should have been gained on Salisbury Plain. It is usually understood that rivers, streams and canals are the most efficient form of obstacles to a mechanized force, and considerable thought is naturally given to a search for a solution of the problem of forcing a crossing. We now propose, however, to draw attention to the effect of wooded and mountainous areas, both of which may have to be crossed in a future European war.

Many frontiers run through mountainous country, and on both banks of the Rhine are considerable tracts of mountainous or hilly wooded country. West of the Rhine are the Vosges and Haardt mountains, the Hunsrück, Eiffel and Ardennes ; to the East lie the Black Forest, Odenwald, Taunus mountains, the Spessart and Thüringer Wald. These tracts vary in detail, some being thickly wooded mountains with occasional small open plateaux, such as the Vosges, others are not so rugged and have more clear spaces, but their valleys are generally steep and tree clad. But all have the characteristic of providing numerous defiles and areas which could only be traversed by infantry, whilst many of the roads which follow the valleys and ascend to the various " passes " are narrow, with hairpin bends and steep gradients. In between these regions exist well-known " gaps " such as those of Belfort, Saverne and Kaiserslautern.

A century ago, Clausewitz drew attention to the effect of this kind of terrain on operations, and pointed out its value to the side which wishes to gain time. He summarizes his ideas as follows: "In mountains every movement is slower and more difficult, costs therefore more time, and more men as well, if within the sphere of danger. But the loss of the assailant in time and men is the standard by which the defensive resistance is measured. As long as all movement is on the side of the offensive so long does the defensive have a marked advantage; but as soon as the defensive resorts to this principle of movement also, that advantage ceases." In 1870, we find there was considerable anxiety at the German headquarters during the advance to the river Sarre, although it was unopposed, whilst the Vosges south of Saverne were avoided by the Germans altogether. In recent times another factor has appeared: that is the difficulty of making full use of modern weapons, particularly in attack.

On the 17th August, 1914, the German Sixth Army, which had been slowly falling back before the French advance between the Vosges and Metz, halted and prepared to take the offensive. The German plan was to hold the French with a frontal attack by the Sixth Army, whilst the Seventh, which had been concentrating in the neighbourhood of the Saverne "gap," was to envelop the French by advancing on Sarrebourg and through the northern passes of the Middle Vosges. This counter-offensive was timed for the 20th August, and the left of the Seventh Army was to move into the hills early on the 18th in order to be ready to co-operate. The German attack in the open country on the right met with success from the start, and the French were driven back some ten miles in the first twenty-four hours. But about Sarrebourg the advance was not so quick, and further East progress became less and less rapid. The left corps should have taken the Col du Donon early on the 20th, but did not succeed in doing so until the 22nd, by which time the French had already evacuated it. The German Official Account attributes the failure of the enveloping wing partly to difficulty of control and co-ordination, but principally to the inability of their artillery to render the necessary support, and the excellent use of ground made by the French *Chasseurs*. To these factors may be added lack of training for such warfare which prevented the infantry making the best use of ground to fight their way forward under their own fire power. It will be remembered that about the same time the French advance into the Ardennes was equally unsuccessful, possibly for the same reasons.

It is hoped that mobility and hitting power will be increased by the use of mechanization, but it remains to be seen whether areas of this kind will not exercise an even greater influence in future than they have done in the past. The probability is that they will. The maintenance

of a modern army under normal conditions will in future be a troublesome problem owing to the air factor. In mountainous areas, the narrow roads, gradients, lack of standings for vehicles or circuits to turn round, and the many defiles will intensify the difficulties of movement and maintenance. In addition, the power and mobility of mechanical weapons is decreased, even when they can be employed at all. Howitzers are hampered by lack of positions and by difficulty in observation, whilst guns have the added disadvantage of crest and tree clearance to combat. Tanks cannot move in the woods or forests, except by the wider tracks; they could hardly turn on many of the roads; they could not move up or down the steep boulder strewn or terraced slopes, even where free from trees. Most of the valleys have an added obstacle in the form of a river or marshy meadows. In the thickly wooded regions, machine guns are at a disadvantage owing either to the shape of the ground or the limited field of view, or both; this is more marked in attack than in defence. Furthermore, machine guns which have to be manhandled up and down steep hillsides, because their mechanical transport is not able to move across country, cannot be said to be really mobile. Consequently, they may, in certain circumstances, become an encumbrance to the attacker. The conclusion is that the side which possess the best riflemen will have the advantage in such country. This view is supported by the German tribute to the French *Chasseurs* mentioned above.

These areas may not provide positions where "a few men can check an army," because the few men can always be outflanked by other men, but they are full of places where an anti-tank weapon or artificial obstacle could stop an armoured force. A mechanized column held up in front on a narrow road with a steep ascent on one side and a declivity on the other, and quite unable to turn, would be a heaven-sent target for air attack, while helpless without infantry to deal with the defenders of the block. The obvious retort is that a mechanized force would use its mobility and go round such areas, but this means loss of time and would probably involve an attempt to cross one of the recognized "gaps."

A commander will naturally endeavour to bring an opponent to battle where the characteristics of his force can best be utilized; but an army which can only fight or move in certain areas is not truly mobile and has limited freedom of action. It must be admitted that an army would not choose a region such as the Middle Vosges as a line of advance, but so long as the object in war is the destruction of the enemy's main forces, it must be possible to attack an opponent who makes use of ground of this nature. Moreover, the assailant himself may require to economise force or gain time by the same means in another part of the theatre of war. Without a high proportion of good infantry these things cannot

be done. It is well known that the French pay considerable attention to mountain warfare and maintain a school dealing with the subject, whilst the existing German Army contains units, including machine gun companies and artillery, specially trained and provided with pack transport for operations of this nature.

Small forces of infantry, suitably equipped, provided with anti-tank weapons and supported by light howitzers, may be expected to have great delaying power in mountainous and tree clad country; and with the aid of judicious demolitions can quickly make large portions of such regions tank-proof. A series of such areas along a frontier, organized in peace, should have the effect of economising covering troops, and would assist in the protection of the mobilization and concentration areas against a sudden irruption of an armoured or highly mechanized force at the outset of the campaign, by diverting the attack into certain well known avenues. Again, such areas may be used to protect a flank or flanks of the main army. Thus, the Vosges might be used in such a manner in the event of a French advance into the Palatinate.

On the battlefield itself, even in normal country, use can be made not only of water obstacles but of woods and enclosed ground as well; the latter would certainly shelter anti-tank weapons. Though tanks may become the principal assaulting arm under certain conditions in open country, infantry must continue to be the main assaulting and holding arm in enclosed areas. It is sometimes overlooked by the enthusiasts who claim that tanks will in future drive all before them that they require fire to support their advance on the battlefield, and that the problem of the frontage which can be covered by the available artillery must be solved just the same as when infantry only are concerned.

The inference is that in spite of mechanization, if not because of it, highly trained riflemen will be more than ever an essential for success. An army which relies too much on machine guns and other mechanical weapons will not be "able to go anywhere and do anything."

WITH THE LABOUR CORPS IN FRANCE

BY THEODORE STEWART, M.A.

IN ancient wars, and even in those of quite modern times, there exists no record of Labour Battalions. Since they were not essential to a successful campaign, the necessity for their existence had not arisen.

In the Great War of 1914-1918, however, they were found to be a very useful accessory to the British armies in the field. The late Sir Douglas Haig, the Commander-in-Chief, fully recognised the valuable work done by the Labour Corps, and mentioned the corps in his dispatches.

I had the good fortune, if such it may be called, to go to France with one of the first Scottish Labour Battalions that was raised, the 12th Black Watch. It is unnecessary to describe the journey from Blairgowrie, our headquarters, to France, but one cannot forget the sleepless nights spent in the cold French cattle-trucks while one was making for the fighting line. The first camping ground, near La Clytte, situated on the road to Dickebusch and Ypres, was at last reached. As darkness approached, the Sergeant-Major of the company to which I belonged arranged fatigue parties, whose duty was to fill sand-bags in the rear and carry them forward for the reconstruction of damaged parts of the front line and other trenches. It was then that one realised that one was "in amongst the real stuff." Now the weird "ping" of bullets through the air and the "whistling" of shells with their succession of "krupps" brought home to one the real character of modern warfare. In this, the Ypres sector, various other pieces of work, quite as arduous though perhaps not attended with the same danger, were executed. These consisted of the digging of gun-pits, the construction of ammunition-dumps, and the formation of a reservoir, from which an effective water-supply was directed towards the line through iron pipes buried about two feet down.

From the Ypres sector the Battalion was transferred to the Somme, where the great offensive began on 1st July, 1916. There entirely new duties were meted out to us, road-making and repairing. Cosmopolitan as we were and representative of all classes, we had, practically speaking, no knowledge of what at first sight seemed a rather difficult task. However, before leaving the Somme, in November, the Battalion had gained quite a reputation in this class of work. In dry weather work

on the roads was quite pleasant, but in wet weather it was most uncomfortable. The roads of the Somme, on which we were engaged, abounded in chalk, and assumed a horrible appearance during and after heavy rainfall. Mud, to the depth of over a foot in some places, collected and greatly handicapped the enormous traffic that was using the roads almost continuously.

One incident, which has a peculiar interest, I shall always associate with the Somme roads. Some German prisoners, newly captured, had been temporarily interned in a building known as Bronfay Farm. The enemy, probably through his kite-balloon observers, had noticed our men repairing the road in the vicinity of this farm-house. Thinking, no doubt, that it was our billet, he began to shell the building heavily. The result was that almost all the prisoners, some twenty-five in number, were either seriously wounded or killed outright, while our own men escaped without a scratch.

From the Somme we passed to the neighbourhood of Poperinghe, where road-repairing was continued under more favourable conditions.

In January, 1917, we proceeded to the Arras sector, where we took part in the preparations for the great "push" carried through successfully in the following April. There we were initiated into a new mystery, the laying of railways. Although we were quite ignorant of, and unskilled in, this particular branch of work, yet, with the genial assistance and under the able direction of the Railway Companies of the Royal Engineers, we soon established a reputation as competent railwaymen. Our first duty was the setting down of the metre gauge single line from Avesnes-le-Compte to Warlus, which was situated immediately behind Arras. The rigour of the winter of 1916-1917 will not readily be forgotten by those who were then on the Western Front. In order to reach the proper level for the proposed line, several deep cuttings had to be made. As the ground was frozen hard to a depth of some five or six feet, the task was by no means easy, and progress necessarily slow. Despite this difficulty, the railway was successfully completed before the specified time, and by means of it huge quantities of ammunition were run up to within easy access of the fighting line. About three days before the "push" began, we took up quarters at an advanced dressing station, not above a thousand yards from the front line, in the town of Arras itself. There some men acted as stretcher-bearers for the wounded, while others performed the more gruesome task of burying the dead. One remembers this as a particularly trying time, since work had to be carried on during both day and night, often under heavy shell-fire. Almost every hour men were being brought in from the streets of Arras where they had been hit by flying fragments of bursting shells. With

the advance of the infantry on 9th April, we also advanced. Railway construction again engaged our attention, the work consisting in repairing the main double line, blown up by the Germans, from Arras Station through a place, popularly called the "Triangle," to Feuchy. Before leaving the Arras sector we assisted in clearing the débris from the railway bridge over the Scarpe, which carried the railway on to Lens, and was destroyed by the French in their retreat in 1914.

Our work at Arras having been completed as far as circumstances would allow, we found ourselves, in May, 1917, again in the Ypres sector, preparing for the great event of the next month, the Messines Ridge attack. Our energies were once more directed towards railway construction. A broad gauge line from "Trent Junction," Bailleul, to the ridge was required. Although we were faced with many obstacles in the execution of this enterprise, yet, before the day appointed for the attack, the line had been set down, packed and tested to the communication trenches and the reserve line, that is, as far as we could safely go with it. The whole area in which we were occupied was, so to speak, seething with artillery, so that the work took us through a sort of labyrinth of guns. When these opened out, as was often the case in the putting up of a barrage, we found it necessary to take cover owing to the deafening noise, but more especially to avoid the danger arising from the premature bursting of shells. Frequently, when heavily shelled by the enemy in the execution of our duty, we suffered several casualties in this sector. It should be explained that these railways were not merely for purposes of running up ammunition or supplies, but also to enable powerful railway guns to be run forward at short notice, and then once more withdrawn into comparative safety. For the successful completion of this railway to Messines Ridge, the Battalion received special commendation. With the advance of the infantry and the artillery on 7th June, we had to accompany them. It was then that we had to encounter what was, probably to most of us, the hardest work we had ever done, the conveying of shells to the guns. The shells of small calibre were not so difficult to carry, but in tackling the 6, 8 or 9.2-inch type we felt that our strength was being tried to its utmost. This task was also rendered more onerous because we were often harassed by the enemy's fire.

After the Messines Ridge attack we moved to an area which, could it but speak, would have a long tale to tell of battles lost and won. This was the high ground just above Dickebusch Lake, between Ridge Wood and Scottish Wood. In this renowned spot we spent a not unpleasant six months, except when occasionally it seemed necessary to vacate it owing to severe shell fire or night bombing by aeroplane. In this sector a broad gauge railway line, from Dickebusch to the ridge overlooking

the trenches, was set down. As the line was constantly blown up we had to repair it frequently. Some distance beyond St. Eloi we put in two gun-spurs for 12-inch howitzers, with considerable difficulty, working for the most part under cover of darkness. In addition, we sent a branch line from Vormezele in the Armentières direction, containing no less than eight similar gun-spurs.

In January, 1918, we found ourselves at Vlamertinghe, immediately behind Ypres. Although we were billeted in that village, our work took us up as far as Passchendaele, a tedious journey on foot of about five hours, where we put down a Canadian light gauge railway. The difficulties attendant upon this piece of work can well be imagined when one remembers that the place was practically one mass of shell-holes, mostly full of water.

In February, we were transferred to a part of the Western Front that was new to us, the St. Quentin area, taken over from the French by the British after the enemy's evacuation of the Arras-Soissons front in the early spring of 1917. After spending a few days in Nesle, a typical French town, where one could see abundant evidence of the German occupation, we proceeded to a small village called Guivry. The impressions one formed here of the natives were quite different from those presented to one in other areas. Everywhere the people were more hospitable to the British soldier and seemed to realise to a greater degree the extent of his sacrifice. Having themselves suffered under German rule, they welcomed gladly the more generous and kindly attitude of the British. In this district we remained as road-repairers until we were driven out by the overwhelming pressure of the enemy on 21st March. The retreat which followed can be better imagined than described. After wandering for about three weeks we arrived at a little village called Fosseaux in the Arras sector. There we erected a series of barbed wire entanglements as a precaution against the further threatened advance of the enemy. At the end of a fortnight we moved to Le Nieppe, where we constructed the General Headquarters' Line, as it was called, which was ultimately extended to the whole length of the Western Front.

It may not be out of place to explain how the Labour Corps grew into a fighting unit. Before the retreat of the British, on 21st March, 1918, the Labour Corps was not armed, consisting as it did of men whose medical categories were "B.2" and lower. Whatever disastrous results followed from that retreat, it was the means of showing of what stuff the Labour Corps was made. Several companies were speedily armed and thrust into gaps in the line, where they were often almost as much a support to the troops in the trenches as the artillery. No sooner

had our positions been consolidated after the retreat than every Labour Company in France was armed and put through the regular course of musketry in the same way as the infantry. We were by no means idle at this moment, so that our energy was sorely taxed by the time we had finished the day's work and practised rifle drill. Subsequently the Black Watch Labour Battalion was afforded opportunities of proving its worth as a fighting unit. It was on several occasions in "reserve" and "support" trenches when the enemy was threatening to attack, particularly in the Lys sector.

When the turning point had come, after the crisis was over and the enemy had to withdraw in the north to prevent his line being broken, he blew up the double railway line which connected Hazebrouck with Lille. The rails were either twisted or partly damaged by explosives, and many sleepers were rendered absolutely useless. Bridges were everywhere "dropped" or completely destroyed, huge mine craters were left in the centre of the track, and every conceivable obstacle was left to retard the quick re-laying of the line. What must, I think, be recognised as a wonderful piece of work was now accomplished by our Battalion, namely, the re-construction of the railway from Strazeele past Bailleul, Armentières, and Lille to Roubaix, where we were working when the armistice was signed. This was our last effort, and it might be called remarkable. Thirty to forty kilometres of the line were laid, packed and tested in little more than two months, in spite of the difficulty we experienced in pushing aside the broken sleepers and rails to repair the track. Perhaps the greatest speed was attained between Armentières and Lille, where we laid over a mile of line per hour. The rebuilding of the railway bridge over the Lys at Armentières was, without doubt, the greatest engineering feat which I witnessed during the War. It should be explained that this bridge was twice blown up, once by the British on 9th April, 1918, and a second time by the Germans, who had rebuilt it, in their retreat. It was largely due to the energies of our Scottish Labour Battalion, under the guidance of the Royal Engineers, that the bridge was completely rebuilt within three days. Our rolling stock was able to pass over it while the enemy was not more than three or four kilometres distant. No idea of the immensity of the task of re-laying this line and rebuilding the several bridges could be formed by any one not actually on the spot and taking part in the operations.

It will be seen that the Labour Corps was not wholly stationed at the bases, as has sometimes been imagined. It is true that some companies were to be found at the bases, but others there were who were always engaged in strenuous and often dangerous work in the forward areas. What is more, the Labour Corps may well claim to have contributed materially towards victory.

THE MERCANTILE MARINE IN A FUTURE WAR

By SIR NORMAN LESLIE, K.B.E.

On Wednesday, 30th January, 1929 at 3 p.m.

ADMIRAL SIR R. G. O. TUPPER, G.B.E., K.C.B., C.V.O., in the Chair.

THE CHAIRMAN, in introducing the Lecturer, remarked that Sir Norman Leslie is associated with a celebrated line of steamers, which has developed from the wonderful sailing ships of the Aberdeen Clipper Line. In the early part of the War he was called to the Admiralty to help the Transport Department in taking up shipping. Later on, he was detailed to play a very important part in connection with the convoy system.

LECTURE.

I AM assuming in this lecture that Greater Britain is at war with a strong naval power which has a base or bases for attack on the trade arriving in the British Isles, and the first question that arises in my mind is whether the enemy would make a direct attack on shipping in violation of international law. We know that in the end such action did not pay the Germans and it is open to question whether in the future a combatant would risk the complications which might ensue from a policy of sinking without trace.

Whatever the answer to this question may be the Mercantile Marine looks to the Royal Navy to protect it. We know that one cannot have absolute immunity from danger, and we know that the courage of our seamen is superb; but we must be guaranteed a reasonable degree of security from attack from under, on, or over the sea. We must have what at Lloyd's is known as a fair insurable risk. If that can be provided by the Navy, merchant ships can carry on their trade, and it is on the uninterrupted conduct of their business that the success of war depends, for the very existence of Britain lies in the maintenance of her trade.

During the Great War, the authorities learnt much about Britain's dependence on her oversea trade, and when meat tickets were hard to come by, and the flour was flavoured with potatoes, even the public

began to take an intelligent interest in the subject ; yet in spite of the general lip service to the idea it is doubtful whether the man in the street really appreciated his position, and very questionable whether he ever thinks of it to-day.

As a reminder of how we stand, we may recall that we import 80 per cent. of our daily bread and 75 per cent. of our meat. Yet war is not carried on by bread alone—(of iron ore, for instance, we imported during the Great War some 7 million tons a year). It is interesting to notice, however, that at first the loss of a wheat cargo created quite a stir, but when a vessel loaded with machine tools was torpedoed no one took much notice. Then someone woke up to the importance of nitrate and for a time there was great anxiety about the safety of nitrate steamers, and when the great increase of oil burning took place in the fleet there was a marked disposition on the part of the Admiralty to concentrate on the protection of tankers, for the number of these had not been increased *pari passu* with the demand, and so we had to use the ballast tanks of our ships and cut down other goods.

The fact is, it is a problem of extraordinary difficulty to decide what is an essential import and what is not. Only the expert in each particular branch of manufacture can say.

Quite a good case might be made out for obvious luxuries. Even the importation of American gramophones could be defended on the score of maintaining the morale of the people and it is well-known that the shipping controller insisted on bringing home vast quantities of tea to keep up the spirits of the female population. Lord Maclay, by the way, is a teetotaler.

But our efforts must not be directed wholly to the maintenance of our inward trade. Our exports are just as imperative ; indeed even more imperative, for without the exports we should have nothing with which to pay for the imports, and injury to the export trade has a later as well as an immediate effect. The immediate effect is a diminution of credit, with all which that involves, even eventual defeat ; but any prolonged interruption of the flow of our outward trade means a loss of customers when the war is over, bad trade and distress. When foreign nations cannot get the things they want from their accustomed source, they set about looking for other suppliers, or start factories themselves or get into the way of using substitutes. Trade runs in grooves and once it has got out of a groove it is very difficult to recapture it. Thus many of our manufacturers found that during the period when Britain was a colossal munition factory their clients abroad had discovered other ways of getting the goods they had been accustomed to buy from us. When giving me some instances of the

great impulse given by the war to the local manufacture in India of such rough commodities as fireclay, pig-iron, coke and cement, a ship-owner—who can tell these tendencies by the variation in his cargoes—mentioned that before the war the Soudanese bought their cotton garments from Lancashire. The war gave the Japanese an opportunity to capture this trade and subsequent higher costs of manufacture here have so far enabled them to retain it.

Do many of us think what we owe in our daily life, even in peace time, to the work of the merchant sailor? Let me give a few examples by way of illustration: the sheets from which we reluctantly emerge in the morning were made of cotton brought from the United States or Egypt or of linen grown, it may be, in Russia or New Zealand; the wool of our blankets came off the backs of sheep in Australia, New Zealand or South Africa or the Argentine; the hide to make our boots may have come from India, West Africa or Montevideo, and similarly for the rest of our masculine garments. If there were no ships, woman would return to leaves. She may restrict her attire, as asserted by Mr. Philip Snowden, to the output of a single silkworm, or, if of a frugal mind, to the chemical product of a test tube, but she must get a couple of sailors to help her, one to bring the material and another to see he does not get molested on the way.

Coming down to breakfast we find nearly all the bread, most of the butter, perhaps the bacon, possibly—it is a depressing thought—even the eggs have come to table from some steamer's hold, to say nothing of the grape fruit, or the more homely apple. Then there is the coffee or the tea, and the sugar, most of it, and above all, the morning pipe. The material on which our daily paper is printed comes from Newfoundland or Canada. The woodwork in our houses is brought from Norway or Sweden, the asphalt in our streets from Trinidad or Mexico, the petrol in our cars from the United States and so on till we reach our final glass of whisky, half of which was made from imported barley. Practically the only things we have used during the day for which we do not owe a debt to the merchant seamen are the water in our baths and the coal to warm it.

MERCHANT SHIP TYPES.

The ships which carry all these things are divided into many types, although to the non-seafaring population there would appear to be but two classes: the "liner" and the "tramp."

By "liner" the public mean the kind of vessel on which they saw someone off to Bombay or the funnels of which they have seen towering over the houses as their train passed through Southampton; in short, a large passenger ship. Everything else is a tramp, and the derogatory

sense conveyed by the name from its association with the verminous vagrant who begs at the back door, obscures the real meaning of the word, which is "someone who travels in search of work." To such people a tramp is a vessel, very grimy, not very well found, and not really very seaworthy. Perhaps some of these fancied characteristics owe their origin to what I think to be some rather unfortunate lines by a great writer. You will remember how "The Ballad of the 'Bolivar'" ends:—

"Just a pack of rotten plates puttied up with tar,
In we came, an' time enough, 'cross Bilbao Bar,
Overloaded, undermanned, meant to founder, we
Euchred God Almighty's storm, bluffed the eternal sea."

Poetic licence must have made the poet forget all about Lloyd's surveyors, the Board of Trade and the Seamens Union, and the underwriters.

He made amends later, however, when he wrote:—

"The liner she's a lady and if a war should come,
The Man o' War's 'er 'usband and 'e'd bid 'er stay at Home,
But, oh, the little cargo boats, that fill with every tide,
'E'd 'ave to up and fight for them, for they are England's pride.'
The liner, she's a lady, but if she wasn't made,
There still would be the cargo boats, for 'ome and foreign trade,
The Man o' War's 'er 'usband, but if we wasn't 'ere,
'E wouldn't have to fight at all for 'ome and friends so dear."

You will observe Kipling used liner as synonymous with passenger ship. The truth is that a liner is a vessel which goes at stated intervals between fixed ports; some carry passengers, but many do not: the characteristic is that they run in a regular line. Knowing the ports with which they have to trade, the kinds of weather they have to encounter and the nature of the cargoes they have to carry, the owners, as experience grows, tend to have a type of ship built for their particular business. These considerations will govern her speed, her dimensions, the number of decks, size of hatches, length of derricks, and even her means of propulsion. If she is to be used permanently in a light weather trade she may even not be as sturdy as the ordinary tramp, which has to be ready to go anywhere and with any kind of cargo and to withstand the strain of any kind of voyage.

Nearly everyone has lived for a period, even if only for a short one, in a passenger ship and so knows something about the capabilities of that class of vessel, but sometimes it is not realized that great size does not necessarily imply great capacity for cargo. When we were suffering from the submarine attack in 1917 and before we started to bring over

the American troops, people asked why the "Mauretania" and other similar fliers were not transformed into wheat carriers, seeing that their speed rendered them less liable to successful attack than was the case with the slow ships. It was not generally recognised that after these very fast vessels had got their bunkers on board there remained only a small margin of carrying capacity for cargo. There are two main types of passenger vessel, the express boat which relies almost entirely on passengers, and the ship of medium speed which combines passenger accommodation with large cargo carrying power.

The express vessel is found on the shorter routes between countries with a large and wealthy travelling public, while the more distant countries with smaller populations and comparatively few millionaires are served almost entirely by the combined passenger and cargo vessel.

The purely cargo vessel for overseas trade may to-day be anything from a ship carrying four or five thousand tons up to one with a deadweight capacity of fourteen or fifteen thousand tons, and the speed will range from seven knots to fifteen knots. The tendency is always towards the larger and the faster, but the desire for increased speed is more marked in the case of the cargo liner than in the tramp. One of the reasons for this is that the possession of the speedy boat gives the liner owner a certain amount of protection against attacks on his trade by tramps; and another is competition on the same route amongst the lines themselves for the favour of the merchants. Cargo ships are mainly divided into those intended for the carriage of general cargo, that is to say parcels of all kinds of goods, and those for the transport of homogeneous cargoes. For general cargoes, vessels with two decks or three decks are most suitable, as the numerous subdivisions make it easier to deal with the separate commodities.

For homogeneous cargoes such as ore, coal, timber or grain a single-decked vessel is preferred because she is quicker and cheaper to load and discharge.

Then there is the question of cubic capacity. For vessels intended to carry coal to the Mediterranean and ore home, this consideration does not arise, but a ship designed for a trade like that with New Zealand where the homeward cargoes are mainly frozen meat, dairy produce, wool and flax, a very roomy ship is a necessity. Two vessels with the same deadweight capacity may differ widely in the space they have available for the stowage of the cargo. The difference may be as much as that between fifty cubic feet and seventy-five cubic feet per ton deadweight.

Tonnage is a difficult question as it means so many different things. In the Royal Navy where the weights are practically invariable one has

displacement. In the Merchant Service there is first of all *register tonnage*—this may be gross or nett. Gross tonnage is the number of hundreds of cubic feet enclosed, below deck and in deck houses. Nett tonnage is this figure minus an arbitrary reduction for propelling machinery and crew space. Suez Canal tonnage approximates to gross tonnage, but none of these is any reliable guide to what a ship will carry. *Deadweight tonnage* means what weight of cargo and bunkers a vessel can sustain, when she is loaded down to her Plimsoll mark.

There is a growing tendency to specialize in ships for particular trades. The most prominent is, of course, the tanker; then we have the ship intended for the carriage of fruit, and the ship built to carry chilled beef, the vessel for frozen meat and frozen butter, the ship designed for full cargoes of locomotives, on the hoof, if I may put it so, in which the cargo proceeds to its allotted berth under its own steam.

The bunkering of merchant steamers was a subject which gave considerable trouble to naval P.N.T.Os abroad during the war. A naval vessel has certain spaces set aside for bunkers and likes to have them full. A cargo steamer also has permanent bunker spaces, but can, if required, utilize her hold space for additional fuel; it is merely a question of reducing cargo. On the other hand, she may not require any more bunkers than are necessary, with an adequate margin, to reach the next coaling place. She must have enough space and lifting power to carry bunkers for her longest leg, but the quantity she takes for the shorter legs entirely depends on the price; and the length of her longest leg will depend on the relative cost of the fuel and the rate of freight on the cargo. I am speaking now of coal burning steamers. With oil burners it is a little different, because one cannot carry oil fuel in an ordinary cargo hold; and with motor ships the problem is entirely altered. Their consumption is so small that they tend to bunker to the fullest possible extent at the cheapest price. I say tend, because a motor ship coming home from Australia *via* the Canal with a cargo of wheat would not want to reduce her lifting capacity for the run home with wheat by filling her bunkers in Australia, when she could get them replenished at Aden or the Canal, and probably at a lower figure.

OIL PROPULSION.

As things are at present the increasing use of oil for propulsion is fraught with difficulty, and in time of war with danger, for this country. The subject was fully, and, if I may say so, very ably dealt with in a lecture given here in November, 1925, by the late Admiral Sir Edmond Slade, who was a Director of the Anglo-Persian Oil Company. Speaking three years later I can say that time is confirming his forecast of the rapid growth of oil consumption.

Whereas in 1924 the world's production of oil was 137,000,000 tons, last year it was 170,000,000 tons. Of this huge quantity the output from territories under the British flag was only 2,850,000 tons, while some 5,000,000 tons were produced in Persia. The imports into these islands—excluding oil fuel for the Admiralty—were 7,200,000 tons, and the requirements for Australia, New Zealand and South Africa come to another 2,000,000 tons. We draw the bulk, about 85 per cent. of our importations, from the U.S.A. and Latin America.

Such being our peace requirements, what should we require in war? Admiral Slade put it at anything up to 30,000,000 tons. Whence should we obtain this?

When the war broke out there were 309 tank steamers afloat. To-day there are over 1,400. Of these nearly 400 are British owned. Of course, cars, aeroplanes, tractors, tanks, etc., account for a great deal of this expansion in ocean transport by tank vessels, but the use of oil for marine propulsion has grown and is growing rapidly. In the three years from 1925 to 1928 the total tonnage of the world rose nearly 3,000,000 tons, but the tonnage of vessels burning coal fell 1,200,000 tons, some 4,000,000 tons of oil consuming ships having been put into the water. Of these 4,000,000 tons 2,600,000 tons represent motor vessels. The proportion of this type of ship throughout the world has increased in three years from 4.3 per cent. to 8.5 per cent.

In Lloyd's returns of ships building for the quarter ended September, 1928, the world's total was 300 steamers of 1,084,958 tons, and 254 motor ships of 1,419,602 tons gross register.

In Great Britain we were building 160 steamers of 588,675 tons, say of an average size of about 3,500 tons register, and we were only building 60 motor vessels, but the tonnage of these was 497,598, or an average size of over 8,000 tons.

Abroad, however, the position was very different, 140 steamers of 495,283 tons were being built as against 194 motor vessels of 922,004 tons. The average size of the steamers was about the same, but in the motor ships there must be a much larger proportion of small vessels than those we were building.

Summarizing these figures, the proportions of tonnage building in the world at the end of September were 56½ per cent. motor and 43½ per cent. steam. The December quarter showed that steam had caught up a little, having risen to 46½ per cent., with the Continent still causing the preponderance in motor building, but both at Home and Abroad, in ships about 8,000 tons gross register, for every steamer on the stocks there were nearly three motor vessels.

The growth of the internal combustion engine in shipping in the ten years since the war is from 912 vessels in July, 1919, of 752,000 tons to 2,933 in July, 1928, of 5,432,000 tons, of which Great Britain's share is a million and a half.

The Scandinavians were the protagonists in this type of vessel, and as the figures show, foreign nations are still adopting them in a greater proportion than we are. We were slow to follow, partly because we did not trust the engine, partly because the cost was so much higher than a steam engine, and partly because we were afraid of being squeezed for oil; but costs have been reduced, the engine has been proved to be reliable, and we are taking a chance about the fuel. For certain trades motor vessels are the only type which is being built, and even some tramp shipowners are adopting it, although the recent great improvements in steam engines and the reduction in the price of coal give the impression that for the vagrant or tramp the reciprocating engine may continue to hold the field. For passenger ships oil, whether for combustion internally or for steam raising under boilers, is so much cleaner and quicker that its use is almost universal. Perhaps we are on the eve of great events in the use of pulverised coal.

I have wearied you with these figures because side by side with our own growing dependence on outside sources for fuel we are losing the control over foreign shipping which was conferred on us by our coal and our bunkering depots. Moreover, the low consumption of a Diesel engined ship lends itself, I think, to her use as a raider.

A ship of some 13,000 tons deadweight, about 480 feet in length and 8,500 tons gross register, will maintain 11 knots on 13 tons of fuel oil per day, while the consumption of a similar sized ship at 14 knots is only about 32 tons. Such a vessel could, so far as it was a matter of fuel, keep the sea interminably and be free from the necessity of retaining a collier in her company.

In thinking of our Mercantile Marine one must not forget the coasting trade. We have over 2,000 vessels engaged in the trade round these islands and across to the Continent, and unless one is engaged in this business their importance is apt to be overlooked. Innumerable small harbours get their goods regularly from the larger ports by these little vessels, and it is only when one has to requisition a dozen of them to carry supplies to the Grand Fleet at Scapa or to a shallow draft place in the White Sea that one is able to understand the devastation caused by their absence from their own localities. Such action may close down the linoleum factories at Kirkaldy from lack of linseed oil or may reduce to starvation a district in the West of Ireland.

Such is our Mercantile Marine and the trade which is our life blood : and it is on the Navy that the whole thing hangs. But how many people are truly alive to this ? A few months ago the Empire Marketing Board issued a remarkably fine poster showing in different panels various types of merchant ships with a battle ship in the centre supported by representations of Sir Francis Drake and Lord Nelson. One of our most widely circulated picture newspapers reproduced it with this comment : " This poster has raised a storm of criticism on the ground that its value as an advertisement is negligible. What has Nelson to do with Australian apples or New Zealand butter ? " One can only answer that the Grand Fleet under Jellicoe and Beatty had a good deal to do with them, and that their continued appearance in our markets will depend on those who follow these great sailors.

CONTROL OF SHIPPING IN WAR.

To protect our trade the Navy must be assisted by the people who have spent their lives in managing the trade. Not only must we get the best use out of our ships " for the duration " but we must remember that recuperation after a war is a period of trial for any country, and for a country like ours, existing on foreign trade, it is a very painful and lengthy process and it behoves us to see that while success in the struggle is paramount no wasteful interference is made with the Mercantile Marine and the trade which it maintains.

Our experience in the late war would lead us to set up at once a body analogous to that of the Ministry of Shipping, composed of representative owners of every kind of vessel, leavened with a body of Civil Servants drawn from those departments which are accustomed to the handling of shipping problems and the transport of troops, supplies to the fleet, etc. This authority would handle the ships, the movements of which would be under the control of the Admiralty with which there must be the closest and most constant liaison.

A similar body drawn from all the manufacturers, the importers and exporters of the country, should be formed to decide what are the essentials for ships to carry and the countries from which the various supplies could best be imported. Research of this kind could very profitably be conducted in peace and it is important, for there are two methods of protection, (a) evasion from attack and (b) direct protection.

Whoever the enemy may be there are bound to be some seas in which the risk will be less than in others, and so far as possible we should get out supplies along the less dangerous routes. This we may call evasion by the use of the alternative.

For most commodities there is more than one source of supply or else there can be found a substitute : if the trading intelligence of the

country is mobilized and the situation made plain the necessary arrangements can be made. In seeking alternative markets many considerations are involved. There is the Treasury point of view, i.e., how the goods can be paid for, the importance to our side of the goodwill of the supplying country, and, not least, the length of the voyage.

There is also "evasion" in the military sense. Routes can be given to the ships which will make them difficult to locate. The oceans are very wide and even on a frequented track like that of the North Atlantic it is possible without deviation to go from England to New York and see no other vessel on the way, that is till one approaches land; and this brings us to the weak point of both systems. In either case there will be a focal area or areas through which the shipping will be bound to go and which will inevitably be subject to attack.

In the late war the second method of evasion was adopted for nearly three years, and although in some short voyages the routing almost doubled the length of the trip—for example the voyage between this country and the Mediterranean—it proved effective till the enemy found a method of attacking the trade in the focal areas of the British Isles.

So long as it was a case of surface ships, the Grand Fleet was the covering force which guarded shipping not only in the focal area round these islands, but even at such distant points as the Straits of Malacca, the South of Ceylon, or the Cape of Good Hope, and other localities which had to be approached more or less closely.

The unrestricted use of their submarines' guns, and later of their torpedoes, gave our enemies a means, for a time, of getting under the guard of the Grand Fleet, and they made great use of the opportunity. Three months of the success which attended their attack early in April would have forced us into unconditional surrender, and the picture of the scene in the Admiral's cabin would have been the work of a German artist. Although the "Emden" and the "Karlsruhe" did a certain amount of damage and the converted raider "Moewe" accounted for some nine or ten ships before she returned to Germany, it has been said that a more enterprising enemy might have made greater play with raiders. Be this as it may, we should bear in mind that to-day the use of the air would give such attackers a greater range of vision. On the other hand it is equally true that the provision of aircraft with a convoy would greatly assist it to avoid danger.

It may be held that raiders are a nuisance rather than a menace, unless they create such a moral effect as to distract unduly large forces to the detriment of that naval security which must ultimately rest

on a centralised main force. Human nature being what it is, the very mystery attending a raider's operations is apt to magnify their significance.

As flow of trade must be maintained, both outwards and homewards, it will not serve our purpose to reduce the weekly losses and practise evasion by the simple process of keeping the vessels in port whenever danger threatens, although this was frequently done here before the introduction of convoys.

PORTS OF DISCHARGE AND INTERNAL DISTRIBUTION.

Evasion in the way of altering the homeward port when the original destination is threatened is useful up to a point, but before doing so discharging facilities and internal transport have to be thought of, nor can the grooves which trade has worn for itself be disregarded. The Admiralty was frequently blamed during the war when a vessel after safe arrival at, say, Falmouth had been torpedoed on her way up Channel. The fact that there were no means of discharging her cargo at Falmouth was overlooked, as well as the inadequacy of the railway bridges in Cornwall to carry heavy goods trains.

Again, unless the railway services are to be overwhelmed, cargoes must be discharged in the areas where they are to be consumed.

A cargo of ore would be no use in Dublin, and a cargo of meat would be of no use except in London or Liverpool; it is true there are refrigerating stores at Southampton, Hull, Avonmouth, Cardiff, Manchester and Glasgow, but their capacity at present is negligible. For practical purposes all the imported meat goes to London and Liverpool, and London takes three times as much as the Lancashire port. London really feeds the whole of the South Eastern area—probably more than a third of the population of England. It is mainly a question of the cost of transport. In the West and South West, London's influence extends till it becomes cheaper to feed from the Bristol Channel. In the East and North East till the haul from Ipswich or Hull is cheaper, and in the North and North West till the cost is less from Liverpool.

The tendency of late years has been to concentrate the flour mills at the great ports. If supplies were prevented from reaching London, not only would the metropolis starve but an area involving most of the Southern Counties would be involved, and recent figures show that this area is attracting population from the North.

It may be asked why should not London and its dependants be fed from the Western ports. The answer is that distribution in London is done by the Thames. Up the river and into the docks in steamers, and out of the docks and further up the river by barges. This was, tardily perhaps, appreciated in the General Strike, although it was borne in

upon the Government in 1918 when the French Channel ports appeared to be in danger.

There are no centres for distribution whence cargoes sailed from other ports could be taken to the mills, warehouses and stores in London. It is true that in 1926 a milk depot was set up in Hyde Park. That was comparatively easy because fresh milk does not come by sea, but the strike of the barge and tug-boat men revealed that all our other commodities were being held up in the docks. A few convoys of lorries containing flour and escorted by tanks going through the city were impressive, but their contents were comparatively a bagatelle. It was the manning of the tugs by naval ratings and the dispersal by barge of the flour to the wharves up the river which saved the situation.

Whatever the difficulties, the trade of London must be maintained, and the work of loading and discharging in the London docks must be carried on.

THE AIR MENACE.

No doubt the dock areas will be subject to air raids, but experience in France has shown that labour can be disciplined to carry on in spite of attacks from the air.

Will the enemy observe International Law? If they do, then bombing attacks on merchant ships at sea or torpedo attacks by submarines unaccompanied by surface ships for life saving purposes can be ruled out. If, however, the focal points are to be infested by submarines willing to sink ships without reference to the lives of their crews, or by seaplanes from air bases or aircraft carriers, it would appear that we should again have to adopt a system of protection by convoy, and that in the areas threatened from the sky the Admiralty should have under their control, and always at their disposal, sufficient air forces attached to the convoys to defend the trade for the safety of which they are responsible. A possible form of danger which I think would have to be met would be the use by the enemy of fast aeroplanes to locate approaching traffic, followed by a cruiser attack from a hostile base. For after all, the gun is more effective than the bomb or the torpedo. To watch the development of any such scheme would fall to the Naval Staff of the Admiralty so that sufficient warning might be given to enable us to despatch a suitable force to frustrate the enemy, but the convoys would need similar aeroplanes to convey early information so that they could in any event steer a course to enable our force to be interposed between them and the enemy. To facilitate this the merchantmen would keep closer to our shore than to that of the enemy, and might on occasion escape the danger by going up the Irish Sea and North about. Evasion could also be practised by directing the London trade to go North in

the first instance and come down the North Sea. Although the immense and stationary target offered by the dock areas would seem to promise better results to an enemy so placed as to be able to reach them by air, direct aerial attack on convoys in the narrower waters must also be considered.

Against this it might only be feasible to oppose the aircraft carried by the escorting cruiser and by one or two of the convoyed vessels. Recalling the difficulty which the Trade Division had to find guns for merchantmen in the last war, and reading in the papers that the Trade Division is no more, I wonder whether anyone is taking thought for the aerial needs of shipping in a future war.

It is true that convoys involve delays, but systematic loading to catch appointed dates, as evolved during the war, does much to reduce these, and departure from the ordinary routes may lessen the efficiency of shipping just as much, though at first sight the effect may not be so obvious.

If ships are to be handled quickly in port to catch convoys they must be under the control of those who understand the business. Care must be exercised in the selection of Naval Transport Officers, and shipowners must not work each for the benefit of his own ships, but they must pool their facilities for the common good.

To the greatest extent compatible with the national safety the shipmasters must be instructed in the danger they may have to encounter and the way to avoid them. Sufficient praise can hardly be given to those officers who lectured to the merchant captains before the convoys sailed. The good they did in sustaining the morale of the masters by explaining what they really had to fear and by bringing into close personal touch the merchant seaman and the naval officer was incalculable. It would seem advisable that R.N.R. officers should be retained in their own ships where they are defensively armed, and that their naval education should be directed to the command of imperfectly trained guns' crews, rather than to more abstruse subjects for which they are not very likely to have any practical use.

CONCLUSION.

If, in the past, there has been any nation so dull as to underestimate Great Britain's dependence on the sea, the Great War can have left no one any longer in doubt as to our Achilles heel, and we may be certain that in any future war if they decide that it is worth while to risk antagonizing neutrals, our enemies will concentrate on the destruction of our merchant fleet. No conceivable means of attack will be neglected ;

bombs placed amongst the cargo or in the bunkers in neutral ports, gas, mines, aircraft, submarines, gunfire, all will be called into play, as well as anything else that the ingenuity of man can devise.

I remember having read the statement by more than one historian that the *guerre de course* advocated by the French in the old wars was futile because it could never bring victory. That was true when England was self-supporting and when a battle of Waterloo could be staged with as much material as would be expended to-day by a brigade in ten minutes; but this doctrine cannot be true in reference to the Great Britain in which we now live, for a *guerre de course* successfully carried out would place our country in the plight of a beleaguered city doomed to famine in a few weeks' time.

DISCUSSION.

THE PART OF THE ROYAL AIR FORCE.

VICE-ADMIRAL SIR RICHARD WEBB, in eulogising the admirable way in which Sir Norman Leslie had dealt with a very difficult problem, expressed a wish that a copy of his lecture could be in the hands of every Member of Parliament. He pointed out that the responsibility of the Navy in safeguarding supplies in war time must necessarily stop at the coast, and that for the security of the very large and vital area covered by the docks, the Air Force must be entirely responsible. This air menace was particularly formidable in regard to the Port of London.

WAR TRAINING FOR THE MERCANTILE MARINE.

CAPTAIN SELWYN DAY, R.N.R., remarked that in the next war we must expect aircraft to operate over all those waters where enemy submarines operated in the late war, and in addition we must expect to have to contend with more powerful submarines. He also pointed out that while our Mercantile Marine will be larger than it was in 1914, our Navy is already considerably smaller. Under these circumstances he considered that we must train the personnel of the Mercantile Marine now in order that, when an emergency arises, ships may be able to make the best possible use of the armament with which they may be provided.

IMPORTANCE OF OIL FUEL SUBSTITUTES.

CAPTAIN SIR DAVID WILSON BARKER, R.N.R., was not in favour of encumbering ourselves with extra departments. He preferred a very small Committee with representatives from the Admiralty, Board of Trade, Chamber of Shipping and R.N.R., to keep the subject warm.

He emphasized the danger of our position in regard to oil fuel, and the great benefit to the country which might accrue from the development of pulverised coal.

It was his personal feeling that when a nation, however highly civilised, has its back to the wall, it will not stop at anything to get at its opponent's weak spot. We must, therefore be prepared for the same methods of attack as were adopted by our enemy in the late war.

THE ROLE OF R.N.R. OFFICERS.

ADMIRAL V. H. G. BERNARD, expressed the opinion that the Committee of Imperial Defence should advise the Government in regard to post war conditions. He believed that after the last war, while our politicians were creating new Ministries to make "a country fit for heroes," Belgium and France were adapting their munition factories to compete for the world's trade. After a war everybody must work harder for less pay.

In regard to the suggestion that R.N.R. Officers should fight their own ships, if this were to be done, he asked, what object had the Navy got in training them. It was important that they should be available to keep the Navy in touch with the Mercantile Marine, and he alluded to their invaluable services in "Q" Boats as an instance of the good understanding brought about by this training.

THE INFLUENCE OF AIRCRAFT ON DEFENCE OF SEA-BORNE TRADE.

CAPTAIN R. G. H. HENDERSON, R.N., questioned whether air warfare had in any way altered the principles of attack and defence of trade. In his view principles do not change, although weapons are continually doing so. The air "weapon" can now throw its missile, i.e., a bomb, at a range of 250 miles or more, compared with the gun range of 200 yards in Nelson's day, and the 10,000 yards of a submarine gun in 1914. The torpedo has a range of 90 miles as compared with 4,000 to 5,000 yards, while vision had been increased from 20 to 300 miles. Nevertheless the three principles—Evasion, a Covering Force, and Direct Protection—of safeguarding trade in war are still adhered to.

In the next war, air is bound to play a large part, and we shall have direct air protection and air covering forces, but he did not believe that sea-borne trade would be protected by maintaining air patrols along the routes or over focal areas. He agreed with Sir Norman Leslie that in a future war the gun would still be the most dangerous weapon and the greatest menace to mercantile shipping.

AIR OFFENSIVE THE BEST DEFENCE.

GROUP CAPTAIN JOUBERT DE LA FERTE, R.A.F., agreed with Captain Henderson that air power had not affected the principles of war, either generally or in their specific application to the defence of the Mercantile Marine. He also concurred that close protection by aircraft could never be a solution of the problem of the protection of shipping against enemy air attack. Probably the best way of dealing with the menace would be what Captain Henderson called "covering," which he would describe as an offensive as opposed to a defensive policy.

LIMITATIONS OF AIRCRAFT.

MR. ROLLO APPLEYARD, remarked on the distinction between the defence of fixed stations and sea routes; whereas aircraft might serve well for the attack or defence of harbours, their powers as escorts for convoys of individual ships are limited, and in some conditions they might constitute a menace to their friends. He also emphasized the importance of having terminal ports, and an organization capable of competing with the situation of the Channel being closed.

THE HUMAN ELEMENT.

COMMANDER DANCKWERTS, R.N., drew attention to another factor on which he suggested Sir Norman Leslie had not laid much stress, because it is of an imponderable character. He said:

"A very short time ago Her Majesty the Queen, who was at the time bearing a very grave load of anxiety, found time to go down to Tower Hill and there to unveil a monument to twelve thousand men of the Mercantile Marine who had no other grave than the sea. Those twelve thousand men are usually described as non-combatants. They were not men who enlisted to die. They were men who were earning their ordinary living in their ordinary way, but they died. Many of them, before they were drowned or blown up, had probably had frequent experience of being in ships that were torpedoed. We know as a fact that men were torpedoed again and again, and I believe that it is true that no ship was ever prevented from going to sea from this country by lack of a crew or through the refusal of a crew to sail. It is quite possible that in another war those men will have to suffer risks of that kind again; this will depend very largely on the temper of our enemies and the methods by which they conduct war. Unless that spirit which animated the men of the Mercantile Marine is maintained and reproduced in the next war we shall not win."

THE VALUE OF NEUTRAL OPINION.

CAPTAIN LITTLE, R.N., recalled the influence which neutral opinion had exercised in the late war in causing the enemy to hesitate before deliberately violating International Law in his methods of attacking our Mercantile Marine. He urged that such International Law should be kept alive, and that it should be made clear to any belligerent who violated it that he was really violating the laws of humanity. We should then have the weight of that opinion on our side.

THE CHAIRMAN.

In thanking Sir Norman Leslie for his very able paper, the Chairman said that he would like to see a copy of it in the hands not only of every Member of Parliament, but in those of every voter, because the nation does not understand what it owes to the Merchant Navy and the Royal Navy.

In regard to the Royal Navy, he recalled how that Service had recently prevented anarchy, bloodshed and an end to British trade in China; also its services in the Great Strike.

Dealing with the question of air protection of convoys, he expressed the view that aircraft escort would be essential, as would air protection for our fuel stations abroad, where they were open to attack.

He was apprehensive of the position in South Ireland, especially in regard to the difficulties which might arise in a future war in connection with shipping passing the South West approaches to that country.

The customary votes of thanks to the Lecturer and to the Chairman were put to the meeting and carried by acclamation.

INTERNATIONAL ESPIONAGE IN PEACE

BY LIEUTENANT-COLONEL H. DE WATTEVILLE.

ESPIONAGE is no new adjunct to warfare. It was freely practised in the Napoleonic era—indeed long before that time—but appears to have then been regarded largely in the same light as high treason ; neither does it seem to have been thought worthy of any very special measures of repression except in time of war. It was not until after the Franco-Prussian war of 1870-71 that rigorous legislation was enacted for its repression or prevention. The importance then attached to the whole question may be gauged from the attention bestowed in France upon the eradication of any enemy organization that might be “laid down” in the country in peace, with a view to its functioning in war. The story has been related many times over how the German invasion of 1870 was assisted by a wholesale system of resident agents who had been carefully selected and trained, or even “planted,” in France, with a view to the particular parts they were destined to play on the outbreak of war. A mass of literature has been published on this topic, and much of it may fairly be suspected of exaggeration. Many of these “spy” tales have become quite legendary. Nevertheless the existence of a more or less complete system of secret agents resident in France in 1870 can be accepted as being substantially true.

It is not surprising, then, that French legislation for the suppression of espionage in time of peace should have grown since that time ; and, what is more, should have been applied with increasing thoroughness. In company with this development, “spy” literature in France has become more extensive. The most recent contribution thereto, which has just appeared,¹ does not differ very greatly from its predecessors, but it may be regarded almost as a text book on the subject. It possesses, however, one serious defect, in that it mostly covers the same ground as of old, and thus fails to show how espionage may be regarded as broadening its sphere of activity at the present day. The author, on the other hand, does show how the French counter-espionage service has not diminished its activities since the Great War ; and the account of the spy-trials related in this work indicate that there has been no diminution in the practice of international espionage since 1918.

¹ “L’Espionnage International en temps de paix.” By R. Mennevé. 2 vols. Paris. 1929.

It is curious to find that it was not until 1871 that a satisfactory distinction came to be drawn between espionage in time of war and espionage in time of peace. Yet the two things are not only very different in essence, but are conducted on totally different lines and by adopting somewhat different methods; even though they may be conducted by the same persons. In war, there are obviously far greater obstacles to be placed in the way of the spy. Any system of counter-espionage which can then be set up is able to rely on all the resources of a modern state being placed at its disposal; popular prejudice may even demand that this should be so. Money will not be stinted in its service. Moreover, the fact that the death penalty is the normal punishment meted out to the spy in war raises the whole question on to a very different plane in regard to its gravity. Consequently the risks run by the spy are infinitely greater, while the achievement of his task becomes a matter of extreme difficulty. The practice of espionage in war has become a fine art. On the other hand, in peace the task of a counter-espionage service may become one of extreme difficulty. Indeed, the work of combating espionage in peace might, to some extent, be said actually to be hindered by modern political tendencies. The death penalty being no longer applicable, it is necessary, in order to suppress espionage, to rely upon such legislation as can be enforced under normal conditions; only those extraordinary police measures as are sanctioned by law can thus be employed to detect and, if necessary, prosecute the spy caught red-handed. A counter-espionage service is thus forced to depend more than ever upon the skill and ingenuity of its personnel, while it can operate only strictly within the letter of every day law.

It is curious that espionage and high treason should for so long have been regarded much in the same light, for it is only in the last fifty years that an adequate distinction has been drawn between them. High treason is, of course, a crime that could only be brought home to nationals of the state against which an offence of espionage has been committed. Espionage, properly speaking, is committed by a foreigner. But in time of peace there would be many difficulties in the way of making high treason the subject of any charge of espionage. It has too diffused a scope. Consequently the laws that have been made applicable in England against espionage have been combined into a single Official Secrets Act—first passed in 1911, then reviewed in a stronger form in 1920 as the result of the experiences of the Great War. This Act, moreover, possesses the advantage of being applicable to any offences resulting from a breach of fidelity on the part of any Government servant or of any person employed in connection with work affecting the security of the State. Its scope is wide.

Indeed, the need for an Act of this compass is clear, since the sphere of espionage has broadened and is still broadening considerably. The spy proper used to seek information alone. But now-a-days there is an ever-growing field for his activity. He is no longer concerned solely with the acquisition of information, or with the discovery of secrets concerning war material. Sabotage, or the perpetration of acts calculated to hinder the function of any national service in such manner as to jeopardise, even to a trivial degree, the security of a State in time of war, may be regarded as being as dangerous as any act of espionage. We thus conclude that the work of the secret agent, as many spies might now be more properly termed, must be suppressed and punished when detected in the same manner as the true spy.

This is not a new distinction, since, in the war of 1870, the destruction of railways was the objective of bands of French *franc-tireurs*, who were shot, if caught red-handed, by the Germans. In the Great War the field of activity of the secret agent extended still further. At first it was thought probable in this country that acts endangering communications, principally the railways, would be committed; that explosives, incendiary fires, and similar catastrophes might impede the work of munition factories, if not actually cripple the output of munitions. That such events did not materialize has little to do with the risks that may have existed, but which may be taken as increasing in the future.

Even the above catalogue does not cover the possible activities of the secret agent of to-day. Political activities lie within his scope. Discontented elements, disloyal "minorities," are to be found in very many European States; these might easily be worked upon so far as to impede, to say the least of it, the action of that state, if it came to be entangled in a war.

In Germany, in August, 1914, there broke out an epidemic of hostility against all high-powered motor-cars travelling at speed through the country that led to their being fired upon by excited villagers with fatal results. These *Goldautos*, as they were called, were reputed to be conveying foreign agents furnished with large sums of money, which they were alleged to be distributing to the "politically unsound," with a view to inciting them to commit acts prejudicial to the German conduct of the war. In our own country there were various outbursts of violent prejudice against supposititious foreign agents, which, in most cases, verged on hallucination pure and simple. However ridiculous many of these manifestations may appear to be, they all point the same way: the sphere of activity of the secret agent can expand still further. If it does, it may take the form of exciting popular passions in little expected directions.

There exist, moreover, two very real dangers to the internal security of a modern state. The first is the effect of skilfully directed subversive propaganda, as typified by the results achieved during the Great War in more countries than one; for example, do we not hear of Communist, anti-militarist and anti-national movements? The second is the possibility of financial or industrial manipulations designed to injure the economic stability of a state at war. In short, the possibilities of psychological or economic warfare have not yet been properly explored.

Before the war the most popular form of espionage was held to be that directed at discovering the secrets of fixed works of defence, their armament, their bomb proof accommodation and their garrisons. How mistaken all this was, it did not need the Great War to reveal. Surely a certain British Staff Officer was right who long before 1914 stated that the knowledge of every secret of every fortification in Europe was as nothing as compared with a correct, if only partial, insight into the German plan of mobilization. To-day this is even more true. Projects for the employment of mechanized forces, of gas, of aircraft, schemes of aerial attack and defence, must clearly be among the main objectives which any effective system of espionage will aspire to penetrate. What of the many secrets regarding the future construction of aircraft and of tanks alone?

Such discoveries might be regarded as of paramount importance to any state meditating warlike action.

It is for all these reasons that the centre of gravity of espionage, or of secret enemy agency, may be said to be shifting from the attack of purely naval and military secrets to the acquisition of scientific, mechanical and industrial secrets, whilst one of its main tasks may be that of assisting in the preparation of schemes whereby to paralyse the action of a belligerent state by subversive propaganda and of the dissemination of injurious rumours. To-day the security of a belligerent state might be said to rest far less on bricks and mortar, armour plate and the fixed armament of fortifications, than it does on a multiplicity of mechanical adjuncts, industrial output and economic solidity. It is the numerous secrets connected with these matters and the State Departments which control them, that form the main target of espionage in time of peace.

The modes of espionage attack are probably and to some extent also altering. The civil factories, testing grounds and laboratories, which are now engaged in the production of aircraft, chemical products, or of scientific apparatus, are as important as any State establishment of a like nature. There are also the political and economic points of attack to consider. Modern espionage demands scientific and mechanical as much as military knowledge.

For these reasons the task of any counter-espionage service may be said to have been complicated beyond measure. It is indeed significant that in the exhaustive volumes of M. Mennevée, and in all recent books of a similar type, so little should transpire about these new aspects of espionage and of the methods pursued to combat them. In fact in all this mass of modern literature we can find but two main tendencies. The first is the narrative of the work of the spy in time of war. Such books are mostly written in the vein of a tale of adventure, combined with a dash of the detective story. The second is the emphasis laid on the dangers accruing from foreign espionage conducted on the familiar well-worn lines. Little, very little, is said of any potential espionage of the more modern type as depicted above.

It is, of course, perfectly natural that no state should nowadays feel disposed to reveal its secrets in so delicate a matter—far from it. Likewise, we can never hope to obtain from any normal publication any correct description of the counter-espionage activities of any European Power. M. Mennevée's book goes far to prove that. An unvarnished account of all espionage work, both in attack and defence, is not likely to be written. Neither is there much probability of the highly coloured matter, dealing with the spy's real work, ever being publicly corrected. The desire for secrecy, on the one hand, very natural human failings, vanity and the like, on the other, stand too much in the way.

But in the absence of such credible statements, or of such correctives, it would be very unwise to believe, as it would be even dangerous to maintain, that injurious spy, or secret agent's activities are not afoot and that we can dispense with protection against such risks. Such activities have not perished with the Great War, as M. Mennevée's second volume shows conclusive.

It might far more surely be argued that, owing to the deeper, more bitter, political and social cleavages of modern society, combined with certain anti-militarist, if not anti-national, tendencies of the times, there exists a greater danger that secret agencies can succeed in our midst than before 1914. For the prizes to be won are more numerous and greater while the roads leading to their attainment are wider and easier. The value of money is smaller; it is more lavishly spent. States to-day may be ready to pay more highly their secret agents who can be relied upon to do good work. It has been stated in many books, if not in so many words by M. Mennevée, that Germany before the Great War obtained but poor value from her spies, because they were badly paid. Great Britain, on the other hand, is held up as having been well served by her agents during the war, because payment was always prompt whenever justified—and also good. To-day, when so much may depend

on the fidelity of men paid a small wage, it would be rash to place too great a dependence on every newcomer to those places where any State secrets, however trivial, are harboured; still more to trust blindly to those in positions where the opportunity for perpetrating some injurious action in time of war is obviously great.¹

The example of certain States, where in 1914 the secrets of mobilization had been well kept, or of others where similar secrets had been permitted to leak out, is there to prove how necessary it may be to restrict the numbers of those ultimately in possession of such valuable data. The most illuminating pages of M. Mennevé's work are those devoted to the trials of spies that have taken place in France since 1919. These affairs, and indeed analogous cases occurring in other countries, seem to show that a very common—if not the most common—method of work of the modern secret agent is to tempt the underling who is not too well paid to sell his employer's secret. Even the cupidity of more highly placed officials, it would seem, may not render them proof against every temptation.

We can conclude that the dangers of espionage are unquestionably as pressing to-day, as of old; while they may grow more insistent the further the adoption of mechanical and scientific implements of war progresses.

¹ See article on "Electric Railways in War"; R.U.S.I. JOURNAL, August, 1925.

THE SERGEANT-MAJOR

BY MAJOR T. J. EDWARDS, late Somerset Light Infantry.

THE military title of Sergeant-Major is of great antiquity and has suffered in dignity at the hand of time.

In his "Military Antiquities," Grose is of opinion that in armies prior to the sixteenth century the Sergeant-Major was, from the nature of his duties, a general officer and was the forerunner of the Sergeant-Major-General. However that may be we are on firmer ground as regards 1518 for a Harleian MS entitled "The Order of a Campe or Army Royal, with the Dutie of every Officer belonging to the same," sets out the duties of this officer in clear terms indicating that they applied to an officer of superior rank and not to a regimental officer. For instance, he states that he had to "divide the weapons and set the order of the battaills accordinglie"; he had "to attend the High Marshall," go with him to "viewe the field" and then "make report unto the Lord Leyuetenant-General and make declaration what order he thinketh is most mete and convenient to set the bataille in"; he had also to "se that the King's standard be placed in the middest of the mayne bataille"; and finally "It is also the office of the said Sergeant-Major to serve with his owne person in the forefront of the battail, and to lead the battail."

The pay lists of this period also show that the Sergeant-Major was something in the nature of our modern Chief of Staff. In 1598 the pay of the Sergeant-Major and the Lieutenant-General of the Horse of the Earl of Essex's army in Ireland was £1 a day each.

By 1634 the title of Sergeant-Major had ceased to be applied to an officer of high command and became attached to a regimental officer, for Barry, writing in that year, states: "The election of the Sardgent-mayor moste comonlie is made by the Generall of such as the Coronelles or Materes de campe doe name or give in relation, his office is to be a generall minister of a whole Regimente of sundrie Companies; And a Superintendente of all the Sardgents of the same." Ward, writing in 1639, ("Animadversions of Warre") gives further details concerning this officer; he states that he was the "third principall officer of the

field and his place and office doth somewhat correspond with that of the Major-Generals, onely his duty is tending to officiate between the Colonel and the officers of the regiment." He was a kind of staff officer of the regiment, whose duties approximate those of a modern adjutant. At this period the Sergeant-Major was the drill specialist of the regiment, just as the Sergeant was the drill specialist of the Company, therefore he was the major or chief sergeant, hence Sergeant-Major.

During the XVIIth century (including the Commonwealth New Model) the Sergeant-Major was the third senior officer in a regiment and, in common with the Colonel and Lieutenant-Colonel, had a Company. At this period each Company carried a colour and the Sergeant-Major's was distinguished by having a blaze or "pile wavy" issuing from the dexter canton (i.e., near top of the staff) towards the centre of the Colour. This distinction still survives in the King's Colour of the 3rd Battalions of Foot Guards.

The title Sergeant-Major as applying to a commissioned officer appears to have been dropped about 1690, for though a major is referred to in "The Exercises of the Foot" of that year, no reference is made to a Sergeant-Major.

The earliest mention of Sergeant-Major as applying to an N.C.O. appears to be in an Order of the Brigade of Guards, dated 18th January, 1725. The Order, which is interesting from other points of view, reads: "The three Regiments of Foot Guards are to furnish a detachment . . . under Command of a Lieut.-Colonel, a Captain, an Ensign, an Adjutant and a Sergeant-Major, as Guards for the balls and operas at the King's Theatre in the Haymarket, and to be aiding and assisting in the preservation of the peace, and preventing all manner of profaneness, rudeness, drunkenness, or indecencies, and not to permit any person whatever to enter the said theatre in habits worn by clergy."

What was expected of a Sergeant-Major in the XVIIIth century is disclosed by the following from Simes' "Military Course" (1777): "He should be man of real merit, a complete Sergeant and a good scholar, sensible and agreeable in conversation, in order to attract the eye of the N.C.O's.; he should be a person who has discovered an early genius for discipline; he must be ready with his pen." Grose, writing in 1800, says: "As the Adjutant is an assistant to the Major, so in like manner he is assisted by the Chief Sergeant, stiled Sergeant-Major." This gives a clue to his duties at that date.

Before 1802 the rank of N.C.O's. of the British Army was indicated in some instances by the pattern of lace which decorated the clothing, shoulder knots and epaulets. In the case of the sergeant, his ancient

badge of office was the halbard and although bayonets were introduced as early as 1662, Sergeants did not give up the halbard (or pike) until 1830. In July, 1802, however, rank chevrons were introduced under which Sergeant-Majors wore 4 bars on their right arms. In 1881 these bars were abolished and a crown substituted, which in 1918, gave place to the Royal Arms now worn.

In 1881, Sergeant-Majors were given warrant rank, following a practice which had been in existence for many years in the Indian Army.

In 1914, the double company system was introduced into the infantry and the Colour-Sergeants of the former single Companies became either Company-Sergeant-Major or Company-Quartermaster-Sergeant in the new double Companies. In February, 1915, the new rank of Warrant Officer, Class 2, was introduced into which the Company-Sergeant-Majors (and all equivalent ranks) were elevated. The Regimental-Sergeant-Majors (and equivalent ranks) thereupon became Warrant Officers, Class 1, also a new rank.

In the Household Cavalry there is no such rank as Sergeant or Regimental-Sergeant-Major, the corresponding ranks being Corporal-of-Horse and Regimental-Corporal-Major.

Before the introduction of Company-Sergeant-Major into the infantry this rank had existed for some years in the Royal Engineers and Royal Army Service Corps, and there was also the Battery-Sergeant-Major in the Royal Artillery.

applicants as a charge against the Regimental Funds. Many Commanding Officers may, with reason, be against applying their funds to this purpose; but after all, does not the end justify the means? Increased efficiency in administration and interior economy means for greater efficacy in the fighting. The Regimental Office is a point in the fighting machine which always has been in sight and cannot be

THE REGIMENTAL OFFICE

BY REGIMENTAL-QUARTERMASTER-SERGEANT H. HOTINE,
2nd Battalion The Oxfordshire and Buckinghamshire Light Infantry.

IT is universally agreed that a fighting force to retain its efficiency must march abreast of the times. Do we in the Army do this? Scientifically we do; and in the essence and practice of modern warfare we carefully study and experiment with each new or improved device with which science presents us. "G" is continually advancing with changing ideas in order to keep the scientific art of war in line with modern improvement. What, however, is the modern office position of "A" and "Q"—does it advance? A glance at the average regimental office, hibernating in systems of long ago, will cry aloud the negative.

Why is this? The answer may be briefly summarised under two main heads:

- (1) Lack of funds for this purpose when every penny of the Military Budget is required for the major object of increasing and modernising the fighting efficiency of the Army; and
- (2) The dearth of personnel with the "office sense", i.e., trained, experienced clerical officers and clerks with a more than superficial knowledge of civilian business office routine; men who are capable of translating their knowledge and experience into our military offices.

Cannot these difficulties be overcome? Yes, to a degree they can. The first objection can be met and has been gradually worn down in the writer's own Regiment. The second objection constitutes the primary and greatest difficulty, yet it is the crying need in the work of increasing our administrative efficiency. What, then, are the remedies?

There can be very little doubt that a release of Government funds for the purposes of standardising and modernising the equipment of regimental offices cannot be hoped for; at least for some years to come. The only remaining solution is for individual Commanding Officers to apply themselves and study the best means at their disposal for the provision of the very necessary up-to-date equipment for their Orderly Rooms, Quartermaster's and Company Offices.

The experience of the writer, covering many years in "A" and "Q", proves that this can only be done by the piecemeal provision of modern

appliances as a charge against the Regimental Funds. Many Commanding Officers may, with reason, be against applying their funds to this purpose ; but after all, does not the end justify the means ? Increased efficiency in administration and interior economy makes for greater efficacy in the fighting value of the Regiment—this telling and important point is a factor which must always be kept in sight and cannot be gainsaid.

EQUIPMENT.

Having arrived at an agreement as to the necessity for providing modern equipment to bring Army offices up to the standard of the civilian office, the question arises as to what we require in this direction. The answer may perhaps best be given by describing the advances made in several regiments—coupled with tentative suggestions for improvement :

The Orderly Room—

- (a) The provision of an adequate number of typewriters and rotary duplicators. The latest noiseless or electric typewriters and the latest pattern Roneo or Gestetner duplicators should be employed ;
- (b) The complete replacement of the unwieldy Regimental Roll Book by an efficient card index ; together with similar indexes for Officers' Records of Service, Courts Martial records, Course records, etc., etc. ;
- (c) The abolition of obsolete and effete letter filing systems, under which the task of tracing correspondence of fairly recent date often wastes the time and taxes the energies of the whole staff ; replacing by (if funds permit) filing cabinets of the "Globe-Wernicke" type. A cheaper system may satisfactorily be adopted by the use of steel foolscap box files, coupled with the Central Registry card index reference system.

The Quartermaster's Office—

- (a) The replacement of the present Equipment and Clothing Ledgers by modern Loose Leaf Ledgers, one leaf to each item ; thus reducing the ledger to the similitude of a card index in book form. This system, although admirable and necessary for efficient modernisation, could only be adopted by the Army as a whole as a governmental sanctioned issue ;
- (b) The use of a card index for recording the history and transactions in small arms. This system is considered of vital importance for the adequate safeguarding of arms in India. By the use of this index it has been proved that it is quite impossible to lose a weapon without at once being able to

produce the relative card detailing the history of the rifle, etc., from the time of its receipt in the unit. This in itself is a valuable aid to the ultimate tracking of the missing weapon, in addition to providing valuable information as evidence on the ultimate Court of Inquiry ;

(c) The provision of an Army Form B-293 (Company return of Army and Accoutrements), suitable to meet all regimental needs. The Form as issued is of inadequate value, therefore the need can be met by local revision and local printing. A.F. B-293 is not subject to Accounts Audit and is solely a Commanding Officer's record of stores sub-held by companies from the Quartermaster ; therefore there can be no logical objection to local revision providing that no public expense is involved.

Small Issue and Receipt Voucher booklets for local transactions between companies and the Quartermaster can with advantage be adopted. These vouchers are entered in A.F. B-293 by the Company Commander concerned, and later checked by the Quartermaster from his carbon duplicates ;

(d) The provisions of paras. (a) and (c) under the Orderly Room heading are also applicable to the office of the Quartermaster.

The P.R.I.'s Office—

The general provision of up-to-date office equipment and appliances, with card indexes as may be necessary to meet the needs of the particular office.

The Company Office—

The Company Office is the smallest but by no means the least important administrative unit in the Army. Its requirements are just as important as the higher offices :

(a) The ancient Army Book 70 must be replaced by a card index following the lines of the regimental card index, which replaces the regimental roll book in the Orderly Room. A man's card would accompany him on inter-Company posting ;

(b) The use of a small arms card index on the same lines as the Quartermaster's Index, cards being amplified to meet company needs and to bear the signature of the man concerned. Cards accompany on transfer of man ;

(c) A card index for details of personal equipment, etc., in possession of each man, appropriate issues and receipts being entered and initialled accordingly.

On inter-company posting this card, together with the A.B. 70 card and the rifle card, would constitute the only

transfer documents necessary—apart from the necessary pay documents. The preparation of manifold forms is thus obviated.

CLERICAL PERSONNEL.

Having now modernised our offices in the matter of equipment what can we do to provide the necessary trained clerks to keep things going?

This is no light consideration and the question can best be approached from two angles—(a) Army provision; and (b) Regimental training.

Undoubtedly the central training of young clerks for the whole of the Army is fundamentally the best system and by far the soundest in principle. This could possibly best be attained by the enlistment of youths into a General List; young men who by their mental and educational qualifications would, after a two year course at a central "Administrative Depot," make highly efficient and specialised clerks for all arms and branches of the Service.

On posting to a unit these clerks would cease to belong to the General List and would become absorbed into the establishment of the regiment or corps. The supply of efficient clerks would thus be ensured to Commanding Officers and he would also be in the position of always having suitable trained men at later dates for promotion to the higher administrative non-commissioned and warrant ranks. The latter question is one which also has its own peculiar problems and is one upon which efficient regimental administration is built. Without efficient higher ranks your modern systems cannot operate.

To turn to the training of clerks regimentally from normally enlisted personnel. Experience has taught that there is a limit, and a very clearly defined limit, to this type of budding administrator.

All Commanding Officers know the weary business it is to secure clerks in this fashion. A clerk is required in the Orderly Room and Companies are requested to submit their recommendations. What invariably happens? The men recommended have declared their trade on enlistment to be "clerks" but how many are *real* clerks? Private Smith was probably a bookmaker's clerk, whereas Private Jones had occupied the dignified position of sub-assistant to the booking clerk at a country railway station. Invariably all of them enlisted at the age of 18 or thereabouts, so where did they acquire the clerical art? Occasionally one may be lucky enough to secure a fairly good clerk in the person of an ex-bank clerk enlisting through misfortune but very rarely is this the case. On one occasion the writer had a University man as a clerk in the Orderly Room: unfortunately in this particular case he would have preferred the bookie's "penciller."

Actually it boils down to the hard fact that the man usually taken into the Regimental Office knows little or nothing of clerical work beyond the office boy work of stamp licking and envelope addressing. Months and years of careful nursing in the office may make something of him in the long run, although it is feared that this material has little conception of the modern office and its equipment.

There is little or no opportunity of training clerks regimentally in the same way as you would train a signaller or a bandsman, solely because the people qualified to carry out such training have their own administrative jobs to hold down and have no time for anything outside of them.

Was it not Dr. Samuel Smiles who said, very truly :

" Do your own work well.

Learn to do the job of the man above you,

Teach the fellow below you to do your job " ?

That, then, is all that is left for the Regiment to do.

Arrange a chain of understudies for all of your clerical N.C.O's and Warrant Officers. The man next for promotion learns the job of the man he will relieve, and learns it thoroughly by concentrated adaptation.

Take the Regimental-Quartermaster-Sergeant, for instance, under this system. He can vacate his office chair and his understudy slips in and carries on without the least dislocation or damage to systematic efficiency—and so on in turn down the chain of administration.

EFFECT OF MODERNIZATION.

In conclusion, what is the effect of the modern office upon the regiment ? The answer must be perfectly obvious.

The nett result is that clerical labour is reduced to the minimum, audit objections are almost an unknown quantity, staffs are reduced, efficient machinery exists for mobilization and other emergencies and offices can close daily at 1 p.m.—even during rush periods as usually precede regimental moves, etc. The soldier clerk is thus released from the confines of the office at a time when he is able to join in the healthful games and recreations of his "duty" fellows. The latter advantage is even "one up" on the modern civilian office !

Everything in the world can be done by sympathetic liaison between the Commanding Officer (who does the paying) and his staff who carry out the work of organization and who must daily improve upon it

AVIATION IN THE ARCTIC REGIONS

THE following views of Dr. Stefansson, the explorer, on conditions in the Arctic, more especially in connection with aviation, are of interest in view of the attempt of the Swedish seaplane "Sverige" to fly from Stockholm to New York, via Greenland.

In the first place, the Arctic, unlike the Antarctic, is of potential value as a thoroughfare. It is surrounded by important commercial centres and the shortest route, therefore, between these centres is over the Arctic circle. It is probable that much use will be made of this route in the future, and for aviation purposes the Arctic is particularly suitable and presents to aviators fewer difficulties and greater attractions than any other of the large oceans.

In flying over polar regions the temperature is inverted, that is, it is considerably warmer in the air than on the ground. This has been proved in Alaska, where it has been found possible to fly even when the ground temperature has been 112° below freezing point. Aeroplanes are in common use when the ground temperature is from 82° to 92° below freezing point.

There are innumerable landing places in the Arctic, whereas in Africa, for instance, aviators have to fly hundreds of miles before finding a possible landing ground. It was the experience of Sir H. Wilkins that landing places in the Arctic were so frequent that he could at any time have landed without difficulty. This explorer has, in fact, made three forced landings on pack ice during one flight, and though in the end he was forced to abandon his aeroplane, it was due solely to lack of fuel. The suitability of pack ice for landing was also demonstrated by a Russian pilot, Bubushkin by name, who, using ordinary skids, made no less than twelve safe landings on pack ice during the attempt to rescue the Nobile expedition. Six of these landings were made in very dense fog and were furthermore made at the worst time of year when the ice was corrugated. Provided skids and not wheels are used there is, therefore, no difficulty in landing and taking off again on pack ice.

As regards landing on land, the sub-soil in the Arctic is frozen between six inches and a thousand feet. Yet even in this six inches of surface soil there are extensive spruce forests, the roots of the trees extending horizontally and not vertically. There is no drainage and consequently

few rivers, but innumerable lakes. These lakes vary in size and depth so that the larger ones do not get frozen up so rapidly as the smaller ones. Hence, even in the transition period of the Arctic seasons there is usually a choice between landing on water or on ice.

The Arctic is the least stormy place in the world, according to Dr. Stefansson, who has spent twelve winters and thirteen summers there. Nansen also, after drifting for over two years, has said that he had never experienced a violent wind during that period, and his evidence is corroborated by other explorers. Certain wind areas exist, such as the east coast of Greenland, but these are known and can be avoided. Fogs are infrequent and seldom universal; they occur either on land or at sea, according to the wind conditions and the difference in the temperature. The winter is the best season for absence of fogs.

The amount of sunlight in the Arctic is greater than in the tropics or in the temperate zones. The sky is clearer and generally unclouded, and in the winter, when the sun is invisible, the stars take its place, the effect of starlight being doubled by reflection from the snow. Additional light is derived from the aurora borealis, the light from which is twice as strong as starlight. Furthermore, the full moon does not set for five days during the month. Half-moon in the Arctic equals full-moon at home and by the light of the half-moon geographical features show up just as well as by daylight.

On being asked what part of the Arctic he considered likely to prove the most valuable, Dr. Stefansson drew attention to the possibilities of the Iceland route, but stated, however, that in his view every island in the Arctic is potentially valuable.

few rivers, but innumerable lakes. These lakes vary in size and depth so that the larger ones do not get frozen up so rapidly as the smaller ones. Hence, even in the transition period of the Arctic season there is usually a choice between landing on water or on ice.

The Arctic is the least stormy place in the world, according to Dr.

THE FUTURE OF DEFENCE IN EASTERN AFRICA

BY COLONEL G. M. ORR, C.B.E., D.S.O., Ind. Army (Retd.)

IN November, 1927, a Commission was appointed, with Sir E. Hilton Young as Chairman, to consider questions relating to the closer union of the Dependencies in Eastern and Central Africa, and allied subjects. Their Report was presented to Parliament in January of this year. They propose "the creation of a Central Executive Authority for the three territories of Eastern Africa in the form of a High Commissioner or Governor-General, who will represent the Secretary of State on the spot, and whose functions will be to exercise a general supervision over the Government of the three territories . . ."

The following remarks are made with particular reference to Defence in the proposals for the closer union of Kenya, Uganda and Tanganyika, under the heading "Co-ordination of Services" [Chapter V].

It is necessary first to give the actual text of the Report on the subject of Defence, after which the present organization of the military forces will be outlined, and finally some remarks will be added on the possibilities of a future re-organization, taking into consideration what the Report says about the service of transport and communications, with which defence is intimately connected.

On the subject of Defence, the Report says, on pp. 132, 133 :—"So far as Kenya, Uganda and Tanganyika are concerned, a Central Authority in Eastern Africa would be able to facilitate the work of the Secretary of State's military advisers in England by co-ordinating the intelligence service and the preparation of defence schemes of the various territories in the first instance. He should also be able, by means of special enquiries and conferences with the Governments concerned, to arrive at equitable decisions on questions connected with the disposition of troops (including the important question of reserves) and the allocation of expenditure. As a result of this more effective co-ordination, combined with the improvement and spread of civilization throughout all the territories, it may be possible within a reasonable period to make some economy in the combined strength of the local garrisons."

"In the first stage we do not recommend any centralization of military control or the creation of a central reserve ; still less any centralization of the administrative work of the various forces. The Central Authority, who would exercise control to the same extent as the Secretary of State does at present, would in the first instance merely fulfil the co-ordinating functions outlined above. The question of unification of military control when communications have been extended and improved, and the possibility of co-ordinating the local reserves with a view to accelerating the reinforcement of threatened points anywhere within the area, could be considered by the Central Authority and his advisers, in consultation with the Secretary of State's military advisers in England, at a later stage. In this connection we have, however, a clearly formed opinion that for the sake of efficiency and economy in East African Defence Forces it is essential that at the very earliest opportunity unity of command should be established under the Central Authority. Without that the essentials of a central reserve and a co-ordinated plan of distribution cannot be secured.

"In the meanwhile, the Inspector-General of the King's African Rifles should, as at present, spend part of each year in England, in order to afford assistance to the Secretary of State and to keep in touch with the latest developments in military organization and training.

"The proposals formulated above do not involve any alteration in existing arrangements for the administration of the King's African Rifles in Somaliland and Nyasaland. These forces should, as at present, be visited annually by the Inspector-General, who would send his reports on them direct to the Secretary of State. Co-ordination in military matters between Somaliland and Nyasaland on the one hand, and Kenya, Uganda and Tanganyika, on the other, should be effected by communication between the Colonial Office and the Central Authority in Eastern Africa."

The present position is that the King's African Rifles, a force which comprises a camel corps and five battalions, but of which four battalions only are quartered in the three territories of Uganda, Kenya and Tanganyika, are administered and trained under the direction of the Colonial Office by an Inspector-General and a Staff Officer with headquarters at the Colonial Office. The Inspector General is the military adviser to the Secretary of State and the respective Governors, and makes periodical inspections of the various units. In each territory the troops are under the orders of the Governor and are entirely independent of units in the other territories. Units are fully officered by British officers, and have a few British warrant and non-commissioned ranks. They are all seconded from our regular army. The composition of each unit includes men from

many tribes in East and Central Africa, who make most excellent soldiery. Their training is continuous and on the same lines as laid down for the regular army. Enlistment is for six years, with re-engagement for further periods of three years up to a maximum of eighteen. Reserves exist of men who have completed a term of service in the active force and have voluntarily enlisted for the reserve. A reserve of officers, to consist of *ex-officers* of the British Army permanently resident in East Africa is in process of formation. According to the pamphlet entitled "Notes on the Land and Air Forces of British Oversea Dominions, Colonies, Protectorates and Mandated Territories," published by order of the Army Council on 28th September, 1928, the primary functions of the King's African Rifles are (i) Defence of the East African Dependencies; and (ii) Internal Security. Except for one of the battalions—the 6th in Tanganyika¹—the K.A.R. may be called on to serve in any part of the world.

The present distribution and strength of the K.A.R. battalions in the three territories is as follows :—In Uganda there is the 4th Battalion (one machine gun section and three companies), which has its depot, headquarters and one and a half companies at Bombo near Kampala, half a company at Entebbe, and the remaining company on the Northern frontier in the Turkana country. In Kenya is the 3rd Battalion (two machine gun sections and six companies), with its depot, headquarters and most of its strength at Nairobi, but with constant patrols towards the Abyssinian frontier. In the Tanganyika are two battalions, the 2nd (one machine gun section and three companies), and the 6th (one machine gun section and four companies). Of the 2nd, headquarters and two companies are at Tabora and one company is split between Iringa and Massoko, which is close to Tukuyu (late Neu Langenberg), near the north end of Lake Nyasa. As this battalion is recruited entirely in Nyasaland, its depot is at Zomba at the south end of the lake. Of the 6th, the depot, headquarters and one and a half companies are at Dar-es-Salaam, one company at Arusha, near Kilimanjaro, half a company at Mahenge, on the plateau south of the Rufiji river, and one company at Songea in the south-west of the territory.

It is interesting to note how the distribution in Tanganyika compares with that of the German forces before 1914, a distribution based on the needs of internal security rather than of defence against aggression from outside. For comparison German companies may be taken as the equivalent of ours in strength. Omitting two companies which they maintained in Ruanda, now mandated to the Belgians, they had twelve to our seven. Of these twelve, four were along the Central Railway,

¹ Because of the restrictions imposed by the mandate.

at Dar-es-Salaam, Kilimatinde, Tabora and Ujiji, as against our one and a half at Dar-es-Salaam and two at Tabora; four were north of the railway, at Arusha, Kondoa and Mwanza and Bukoba, both on Lake Victoria, as against our one at Arusha; four were south of the railway, at Iringa, Mahenge, Neu Langenberg, and Lindi on the coast, as against our three.

Although the Commission does not take cognizance of any forces other than regular, it is as well to remind the reader of what they consist according to "Notes on the Land and Air Forces." In Kenya, the Defence Force ordinance, which became law in October, 1927, provides for a Defence Force based on the compulsory service of British subjects of European race; it also provides for the training of youths up to the age of eighteen. The Force is to have its own commandant and head-quarter staff and a Central Defence Committee. The territory is to be divided into districts each with a district commandant and local Defence Committee, each district sending a delegate to the Central Committee. There are to be four classes, of which No. 1 (18-30 years of age) will do an annual period of training not exceeding 100 hours, while the remaining classes (up to 50 years) will train annually for not more than 12 hours. The Police Force, of 115 Europeans and 1,989 Africans, is armed, fires an annual musketry course, and can be called on to discharge military duties. In Uganda a Volunteer Reserve Ordinance provides for the enrolment of British subjects¹ into District Rifle Corps, of from 15 to 100 members, each corps being under the management of a committee. Training is confined to monthly rifle practice and an annual rifle meeting. The Police Force, of 36 Europeans and 1,232 Africans, serves under the same conditions as that of Kenya. In Tanganyika there is no Defence or Volunteer Force, but its Police Force of 62 Europeans and 1,793 natives serve under similar conditions to those in Kenya and Uganda.

Statistics of population of the three territories are interesting and a knowledge of them is pertinent to a consideration of the question of defence generally. According to the 1926 Census, Europeans numbered 12,529 in Kenya, 1,752 in Uganda, and 5,274 in Tanganyika; Asiatics were 30,583 (of which 26,759 were Indians); while there were also 10,557 Arabs in Kenya and 4,000 in Tanganyika. The African races number about two and half million in Kenya, three and one-eighth million in Uganda, and four and one-third million in Tanganyika.

To turn back to the Commission's remarks on Defence, quoted at the beginning of this article. The first point is that they require *unity of command* to be established at the earliest opportunity. They say that without unity of command "the essentials of a central reserve and a

¹ No mention is made of any restrictions to those of European race.

co-ordinated plan of distribution cannot be secured." From their previous remarks they do not expect their ideas to develop until communications have been extended and improved. They hope that the outcome of the enquiries into defence matters which, they suggest, will be a more efficient and economical distribution of the King's African Rifles. By laying down that these inquiries should be dealt with by the Governor-General, advised by the Governors and the Inspector-General of the K.A.R. (who is military adviser to the Secretary of State), the implication is that these matters are outside the province of the Chief of the Imperial General Staff. It should be remembered that it is with the C.I.G.S. that the responsibility rests of giving advice in matters affecting the security of the Empire.

When unity of command comes to be considered (and with it some reorganization of the King's African Rifles), it is possible that the Royal West African Frontier Force may provide a model. In the West African dependencies those units of the R.W.A.F.F. which are in Northern and Southern Nigeria form, together with a light battery and a mortar battery, a mixed brigade, under a commandant who has a staff for both administrative and general staff duties. There is no doubt that the efficiency of the force in Nigeria is enormously enhanced by the inclusion of a light battery and a light mortar battery. The latter is of the type which proved in 1917, to the writer's personal knowledge when under his command, its value in bush warfare. In West Africa an Inspector-General reports on the other units of the R.W.A.F.F. in the Gold Coast and Sierra Leone territories, as well as on the Nigerian Regiment. This is the system apparently envisaged by the Commission with respect to the units of the K.A.R. in Somaliland and Nyasa, when some future "Eastern Africa Regiment," composed of four or five battalions of the King's African Rifles, together with a light battery and a mortar battery, perhaps becomes a fact in the closer union under a Central Authority.

Along with defence, the Commission have stressed the need for co-ordination of the Service of Communications. They appreciate the importance of through railway communication linking Kenya with territory south of Tanganyika. With the information so far accessible they incline to the proposal of a link from Mombo to Kilosa (on the Central Railway), and thence across the basin of the Rufiji river and its great tributaries to Manda on Lake Nyasa, but they strongly recommend further enquiries as to the economic conditions over all possible routes. The growth of railways, however, in such a country is bound to be slow. Meanwhile a network of motorable unmetalled tracks opening up the country would be of inestimable value as a factor of defence. While the immediate needs of forces operating in such terrain as that of Eastern Africa must continue to be met by carrier transport, the real measure

of their mobility and effectiveness will be the extent to which such forces can utilise light motor transport for their supply and maintenance. To make tracks motorable they must be widened, steep ascents and descents must be graded, water courses normally fordable by cars must have their approaches ramped, otherwise they must be bridged. It is recognised that at certain seasons of the year vast tracks of country are rendered impassable in wet weather either by reason of the prevalence of black cotton soil or of the inundation of large areas, such as in the basin of the Rufiji and its tributaries, the Ruaha and Kilembero. The records of the forces which operated throughout Tanganyika in 1916 and 1917 should afford valuable evidence both about routes and the effect of weather on them. The Commission endorse the immediate construction of the projected "all-weather" road from Dodoma to Iringa and thence South-West to Tukuyu, the adaptability of which to light motor transport owes everything to the efforts of the troops in 1916 and 1917. If not already done the route northwards from Dodoma to Kondoa and Arusha should be included in an "all weather" project. Another road strongly recommended is that by the coast from Kilindini Harbour, through Tanga to Dar-es-Salaam.

The accompanying sketch map shows the routes that are at present motorable in some degree or other, but they do not by any means all fulfil the conditions suggested above. The tracks shown as important may well form the basis of an extended system of motorable roads. It will be noticed that in Kenya there is a great deal more territory to be opened up than in either of the other two dependencies. In view of the fact that the Abyssinian frontier is the one towards which the activities of the King's African Rifles are often directed, it would be an invaluable asset to defence measures if at least one motorable road ran northward, either from Fort Hall or from Gilgil towards Lake Rudolf.

In connection with the considerations that may arise in any redistribution of the K.A.R., taking the three territories as a whole, it may be of interest to note the extent of the frontiers which march with those of the colonies of foreign powers, apart from the 400 miles in the north with Abyssinia. In the north-east there is some 350 miles of Italian Somaliland, to the west about 1,000 miles with the Belgian Congo (including Lakes Albert and Edward and 300 miles of Lake Tanganyika), and to the south there are about 400 miles of the Rovuma River, which forms the frontier with Portuguese East Africa.

In recent years there have been few occasions on which it has been found necessary to use troops against any of the tribes within our Kenya or Uganda Colonies. The area in which most trouble has arisen is the Turkhana country near the northern frontier, west of Lake Rudolf.

In 1906 the Nandi tribe, between Nairobi and Lake Victoria, after being subdued, had to be moved into a reserve. In Tanganyika, during the German occupation, there were risings by the Wahehe in the Iringa area in 1891, 1896 and 1897. But the only serious insurrection with which the Germans had to deal was one which, starting in August, 1905, in the area north-west of Kilwa, spread right down to the Rovuma river and across to Lake Nyasa. The big Masai tribe, who cover a large area from west of Nairobi in the north to Kondoa Irangi in the south, have always been somewhat of a bogey to both former British and German administrations. They are warriors more picturesque than formidable. In Tanganyika the tribe which gave the best soldiery to the German forces were the Wanyamwesi in the area west of Tabora.

Finally, the relation of the Commission's proposals to the mandate for Tanganyika require some mention. The mandate provides that no native military force shall be organized in the mandated area except for local police purposes and for the defence of the Territory. The Commission say that in any unification of the defence forces in Eastern Africa it would be necessary to satisfy the Mandate's Commission, both that Tanganyika was not contributing more than its due proportion to the defence of the whole area, and also that its proportionate contribution was not greater than it would be if the requirements of the mandated area were considered alone.

(Since the above was written, the *Times* of 9th July reports from Geneva, a proposed redistribution scheme for the garrisons of Tanganyika and Nyasa, under which that of the former will be considerably reduced, and both brought under one Headquarters at Dar-es-Salaam. It is believed a similar scheme is proposed for the garrisons of Uganda and Kenya under one Headquarters, which will also involve the move of the 3rd K.A.R., from Nairobi to some place on the railway at or near Gilgil).



THE INTERNATIONAL SITUATION

NAVAL DISARMAMENT

ANGLO-AMERICAN CONVERSATIONS AND GESTURES

SINCE Mr. Hoover became President of the United States, informal negotiations have taken place with the British Government with a view to overcoming the impasse which had been reached in the matter of the reduction of navies. The President's expressions of friendship and a desire for a better understanding with Britain have been warmly responded to by Mr. Ramsay MacDonald since he took office.

Vague allusions have been made to a new "yard-stick" for measuring naval strength, but so far these have not developed into practical proposals, much less any semblance of an agreed working basis for discussion by the naval Powers as a whole.

Meanwhile, on 24th July, the Prime Minister announced the intention of the British Government to make a preliminary contribution towards the success of these Anglo-American negotiations by:

Suspending all work on the 10,000 ton cruisers "Northumberland" and "Surrey."

Cancelling the submarine depot ship "Maidstone."

Cancelling two Submarines.

Slowing down dockyard work on other naval construction.

Further consideration is to be given to the 1929-30 programme before it is proceeded with.

Mr. MacDonald further stated that so soon as the way was cleared by agreement on the existing points of difference between this country and the United States, all the other Powers concerned would be invited to a preliminary conference. The Prime Minister paid a tribute to the Board of Admiralty who, he said, having expressed their technical view on the minimum armaments they consider to be necessary, had furnished loyal help in achieving the Government's object.

In response to this "gesture," Mr. Hoover immediately announced the intention of the Government of the United States to defer laying down the three 10,000 ton cruisers which were due to be commenced this autumn, pending, as he expressed it, "an opportunity for full consideration of their effect upon the final agreement for parity which we expect to reach, although our hopes of relief from construction lie more largely in the latter years of the programme under the law of 1928.

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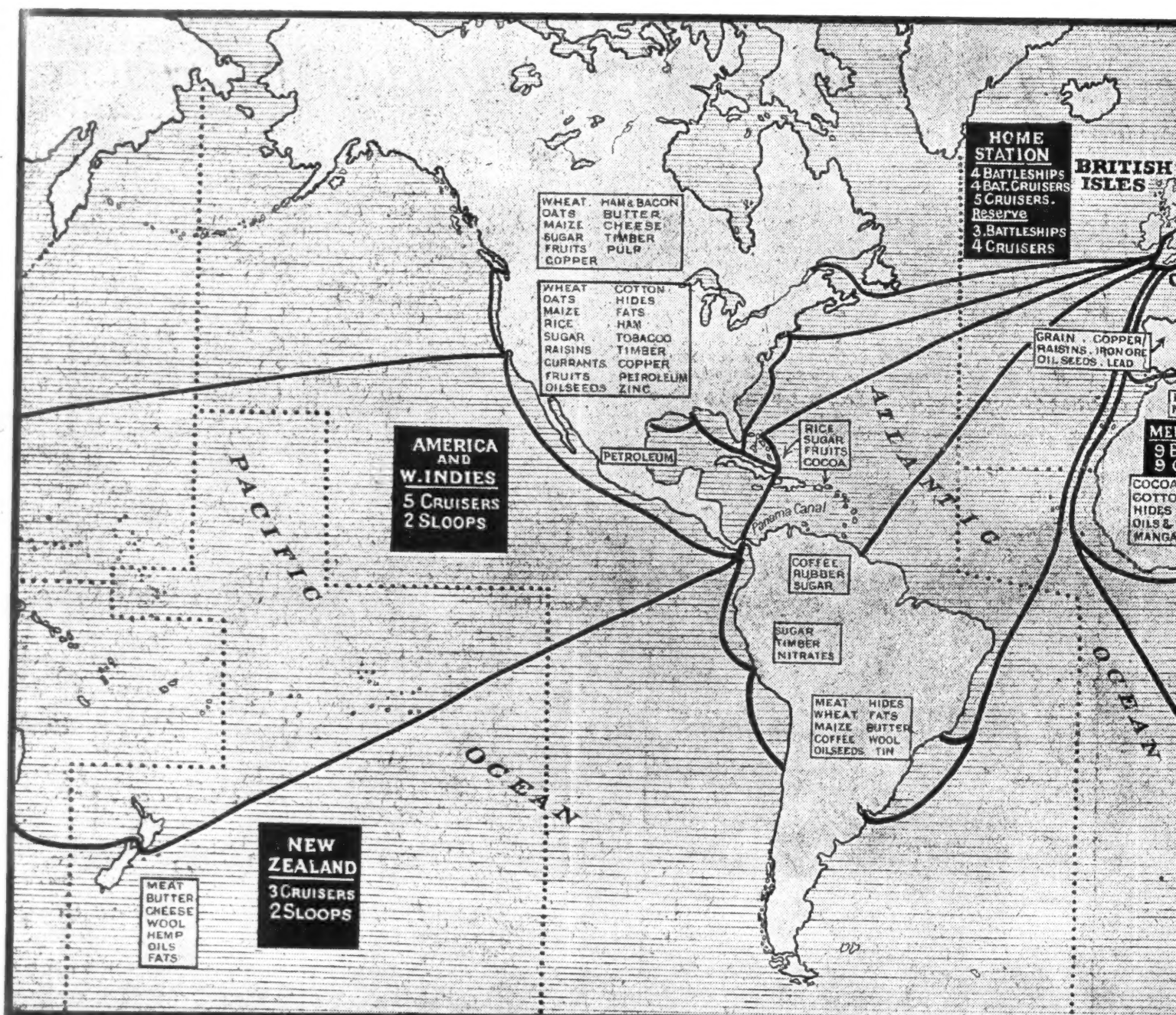
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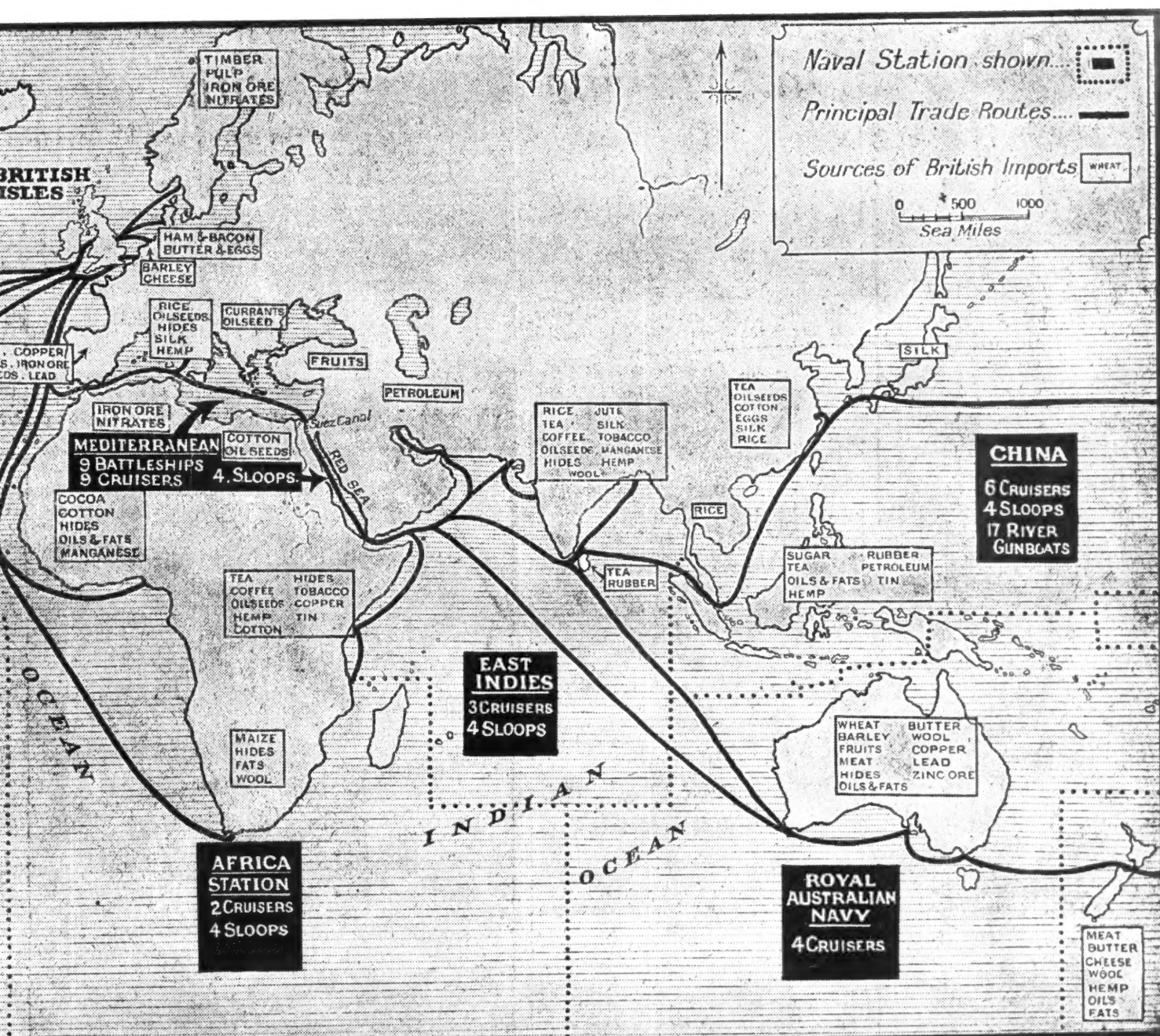
DISPOSITION OF THE BRITISH AND SHOWING THE SOURCES OF VITAL COMMODITIES AND THE M



(By courtesy of "The Morning")

BRITISH AND DOMINION NAVIES, 1929

AND THE MAIN SEA ROUTES WHICH HAVE TO BE GUARDED



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PARITY.

The Prime Minister has formally declared acceptance of the principle of "parity" in naval strength as between Britain and the United States, which fact Mr. Hoover notes with the remark that it has now been adopted on their side. The interpretation of this term "parity" is, however, likely to lead to somewhat difficult discussions. In America there is a strong disposition to regard "parity" as meaning equality, ship for ship, gun for gun, in every class. Mr. Winston Churchill, in a speech at Chingford on 14th June last, brought out the British aspects of the subject very clearly when he said: "But that decision (that the two Nations should be equal Powers upon the sea) implied two conditions. The first was that special regard should be had to the entirely different circumstances of this crowded island, which can be starved in a few weeks, and the great continent in which the people of the United States dwell so safely and so prosperous.

"It would not, in my opinion, be a fair interpretation of the principle of equal powers upon the sea if a mere numerical measure of two fleets, each the replica of the other were to be made the rule. Then we should not have equality, but under the guise of equality an absolute and final inferiority.

"The second condition . . . is that any agreement between Great Britain and the United States must be based upon a tolerant and good-hearted spirit towards naval affairs on both sides of the Atlantic. If naval equality is to lead to a jealous and suspicious scrutiny of every ship and gun and every armour-plate . . . it would be much better to have no agreement at all, and for each of us to go our own way, acting sensibly and soberly, and in a neighbourly fashion, but free and unfettered."

CHINA AND THE SOVIET UNION

THE internal situation in China underwent little real change for the better in 1928. The apparent victory of the Nanking Government, with Chiang-Kai-shek at its head, brought no lasting benefit to the country as a whole, and the year 1929 seemed likely to see a continuance of futile civil war.

The position at the opening of the year was that Chiang-Kai-shek controlled the central portion of Eastern China from Shantung down to Fukien. To the north of Chiang, centred in the Yellow River Valley,

lay Feng-Yu-hsiang. North-West of Feng, again, came the area dominated by Yen-Hsi-shan; this covered approximately the Shansi Province and the Peking area. Still further North lay Chang-Hsueh-liang, firmly established in Manchuria. These were the four main groups of "war lords."

Early in the year a portion of Chiang's forces situated round Hankow, which had shaken off its allegiance to the Kuomintang at Nanking, set themselves up as the "Kwangsi Group" in the middle Yang-tse Valley. As this Group favoured a "separatist" political organization as against the centralized tendencies of the Nanking Government, a conflict was certain to arise.

A Kuomintang Congress held at Nanking on 15th March was noteworthy for the absence of Feng and of all Kwangsi representatives. It is not surprising that it should have passed a strong vote of confidence in Chiang. Shortly afterwards Chiang advanced in force on Hankow against the Kwangsi forces. The desertion of two Kwangsi divisions enabled the Nationalists to occupy Hankow, whereupon the Kwangsi resistance collapsed; the remains of their army retreated westwards and they have now ceased to count.

The situation of Feng, who had hitherto continued to "sit on the fence," now became more interesting. In the end, Feng, whose health is believed to be bad, declared his intention of quitting China and of seeking an asylum in Moscow, which course of action it seems he followed. He has disappeared from the scene.

The stage now seemed clear for Chiang-Kai-shek and the Kuomintang to attempt to dominate the Shansi Group under Yen Hsi-shan and to establish themselves yet more firmly in Canton and in the South.

At this moment, however, the long standing quarrel between China and the Soviet Union over the control of the Chinese Eastern Railway in Manchuria took a critical turn, and so the internal struggles of the war lords of China pass into the background.

The Russian interests in the C. E. Railway go back to its construction by Russia in 1896. The history of the ensuing struggle between Russians, Chinese and Japanese over the control of the railway is of little importance at the moment. Even the question of the ownership of the line is confused. Sufficient to state that an agreement was drawn up in March, 1924, between the Russians and the Chinese by which it was recognised that the C. E. Railway was a commercial undertaking, and that its administration would be in Chinese hands, except for the technical services connected with the operation of the railway, to which Russians would be admitted and which they would manage as before. Lastly,

it was agreed that all further business connected with the C. E. Railway would be settled by China and Russia jointly to the exclusion of all foreign interests. The Russians shortly afterwards also signed a somewhat similar but not identical convention with Chang-Tso-lin at Mukden concerning the future of the railway.

In spite of these agreements the control of the railway has continued to give rise to endless difficulties, while the political interests of Russia in Chinese affairs has repeatedly complicated the whole question. The Chinese, moreover, have been doing their utmost to eliminate Russian influence from the railway, although the process was to be gradual and effected without, if possible, going outside the agreements. Behind the Chinese the Japanese, owing to their large interests in Manchuria have been anxiously watching the course of events, but it would be entirely wrong to associate them in any way with the present crisis.

In December, 1928, the Chinese seized the entire railway telephone administration at Harbin. Other minor inroads on the Russian administration were made, intermingled with political pin-pricks which resulted in a raid by the Chinese Police on the Russian Consulate at Harbin on 28th May. This was followed shortly after by the far more serious step of the dismissal by the Chinese of the entire Russian personnel of the C. E. Railway, on the pretext that this personnel was being employed or encouraged by the Soviet Union Government on Communistic subversive propaganda in China. It is rumoured, however, that the Chinese were prompted to act in this fashion by the belief that the Soviet Union was being tempted to part with their interests in the C. E. Railway—perhaps to Japan—as a financial transaction. Anyhow there is little doubt that Russian prestige in Manchuria was being dealt a grievous blow. It had been on the wane ever since the many setbacks to the Communistic intrigues of her emissaries throughout China during the past three years.

Goaded by this weakening of their hold on Manchuria, the Soviet Union then presented a bombastic ultimatum to the Nanking Government demanding the reinstatement of the Russian Railway personnel in Manchuria under a virtual threat of war. To this the Nanking authorities replied in a Note couched in somewhat similar language. The wording of both Notes followed the best precedents of pre-war imperialistic diplomacy.

The Soviet Union could hardly be expected to accept the situation. Public opinion in Moscow became vocal, while the Bolshevik Government could not fail to attempt to turn the foreign situation to account for its own internal purposes. Accordingly, a second Note was despatched to China, which reached Nanking on the 18th July.

The Soviet Union thereby notified the Chinese authorities that all Chinese officials must leave Russian territory, whilst they stated that all Soviet officials were being instantly recalled. Railway communication between the two countries was to be closed forthwith. This Note, under pre-war conditions, was equivalent to a declaration of hostilities. Indeed some skirmishes are alleged to have ensued near Manchuli, the frontier station between Siberia and Manchuria. A few shots were probably exchanged, while provocative and most bellicose speeches were freely delivered both in Moscow and in Nanking. One striking oration by Chiang decrying the "Red Imperialism" of the Soviet Union is especially noteworthy.

In spite of all these outbursts, however, it seems more than doubtful whether actual war will result. Neither of the potential belligerents is in such a strong military or economic position as to venture on a campaign of any magnitude. It is true that the Red Army may be assumed to be more numerous and, in many respects, far stronger than is often credited, but the effort to bring any overwhelming military force to bear against Manchuria might well prove to be beyond the capacity of the Soviet Union. The Chinese forces would, in the case of a conflict, be represented by the Manchurian Army, possibly the best of the forces in China. Judged by Chinese Civil War standards their value is open to some question.

At present, strenuous efforts are being made to preserve the peace and to find a way out of the quarrel without "loss of face" on either side.

There are two exterior factors in the situation which deserve mention. The first is the position of Japan in Manchuria, for it is impossible to overlook the fact that Japan is deeply interested in both the economic future of Manchuria and in the development and management of the C. E. Railway. It may, however, be conjectured that an armed conflict in Manchuria would scarcely appear to find favour in her eyes. Japanese interests must urge Japan to incline towards working for a friendly settlement. The second factor is the strongly expressed intervention of the United States on the side of peace. In fact, the Washington authorities appear to be recommending not only a pacific solution to the quarrel, but even urging a return to the *status quo*. Whatever pressure this American move may finally exert, it seems to be assumed in all quarters that war is becoming less probable, and that a Conciliation Conference might now assemble and settle the dispute. Such a solution must, however, take time to materialize.

THE ALBANIAN ARMY.

By LUIGI VILLARI, M.C.

THE decision of the Conference of Ambassadors of 9th November, 1921, conferred a sort of mandate on Italy for the protection of Albanian integrity, and by the treaties of 1926 and 1927, which were the logical outcome of that decision, certain duties devolved upon Italy for the carrying out of the mandate. The first of these, apart from general diplomatic support, was the reorganization, or rather the creation, of the Albanian army.

Until this reorganization was effected the Albanian army was an irregular force of small fighting value, inadequately armed with weapons of many kinds obtained from many lands, irregularly fed and seldom paid. The task which Italy wished to entrust to the new Albanian army was a very special one. Beyond the borders of Albania are many hundreds of thousands of Albanians living under Yugoslav or Greek rule—it is stated, indeed, that there are more Albanians outside than inside Albania. Among them are a certain number of refugees who crossed the border because they were opposed to the present government of their country, but these are a small minority, the immense majority being simply Albanian natives of territories assigned to Yugoslavia or Greece, and comprising wild tribesmen accustomed from time immemorial to internecine warfare and ever ready for plundering expeditions. As long as Albania remained disorganized and was without a proper defensive force it was easy enough to raise armed bands for raids into the country. When these bands were created, officered and financed by organizations or individuals countenanced, and indeed enjoying, the support of certain foreign governments, they could easily bring about a revolutionary upheaval and upset the existing government of Albania in order to set up another in its place more amenable to the wishes of the organizers and promoters of the troubles. Even if the attempt to upset the government failed, such raids and the possibility of their repetition served to keep the country in a state of constant ferment incompatible with the peaceful economic development of Albania herself; or indeed of other Balkan lands. We must remember that Monsignor Fan Noli succeeded in seizing power in Albania with a force of 2,000 men, and that Ahmed Zogu did the same with 3,000.

It is true that Italy, under the terms of the decision of the Ambassadors' Conference and the more recent treaties, might intervene on behalf of Albania, if the Government of that country requested her to do so. But the landing of an Italian force might easily lead to international complications and serve to extend rather than to localize the

conflict; it would in any case arouse feelings of unrest and suspicion throughout the Balkans. For these reasons Italy deemed that the wisest course was to help the Albanians to defend themselves. This she has done by creating an Albanian army capable of repelling any aggression such as I have described (as distinct from invasion by a regular army). It has been claimed that an efficient gendarmerie would serve the purpose equally well at less expense. But from its very nature a gendarmerie must be split up into a large number of very small units, widely scattered over the country, and is therefore unable to concentrate at any one spot to repel raids of large armed bands from across the border. The organization of the new force was entrusted to an able Italian officer, Colonel (now Brigadier-General) Pariani, who was appointed chief of the military cabinet of the President (now King) Ahmed Zogu, with functions analogous to those of a Minister of War. He is assisted by a small staff of Italian officers who are, like himself, members of the Albanian army and wear Albanian uniform.

The new army is recruited on the usual Continental basis of compulsory service, lasting eighteen months, and the total peace strength is between 7,000 and 9,000 men. It consists of a single division on a tertiary basis, i.e., it is divided into three groups, each composed of three infantry battalions, three mountain batteries of two guns each, and one company of engineers. There are, in addition, a fourth company of engineers, the King's bodyguard of Mati tribesmen (His Majesty is himself a member of that tribe) and a few other small units. The discipline has been thoroughly reformed by a process of careful and intensive training and hard work, while the corruption formerly prevalent in the administration has been done away with. To-day the officers are regularly paid, the men adequately fed, and the whole force properly equipped and armed. There is an Italian officer to each group and one to each infantry battalion and each company of engineers. The Albanian has always been a good fighter, and with proper discipline he has become a really excellent soldier, but the officers under the old system left a good deal to be desired. A military college, a school for artillery officers and one for reserve officers have now been created, with Italian instructors attached to each, and a new and improved type of Albanian officer is being gradually formed. In war time this force would of course expand and a second and a third division eventually be formed with the trained reserves. To-day the force already presents an excellent appearance.

One serious obstacle to the formation of an efficient fighting force was that while the Albanians have a strong racial feeling, their sense of nationhood is only in the embryonic stage, at all events as far as the mass of the people is concerned. To develop this sense it was necessary to influence the rising generation. A national voluntary organization

of Albanian youth, on the lines of the Italian *Opera Nazionale Balilla*, open to all boys from 8 to 16 years of age, was created, while boys from 16 to 20 years of age attending school are compulsorily enrolled in the pre-military training corps, corresponding to the Italian *Avanguardisti*. Both organizations are developed on the basis of strong patriotic sentiment and sport. The national traditions, the idea of Albania as a nation and patriotic duty, are instilled into the youths' minds from an early age, and at the same time the boys are trained to all forms of manly sports. It is thus hoped that in a few years the whole manhood of Albania will be capable of providing the necessary force for resistance to aggression, and indeed even now the mere existence of a small but well organized army has rendered the danger of raids such as I have described above far more remote than it was a few years ago. Of course if one of Albania's powerful neighbours were to attack her with a large regular army—Yugoslavia, for instance, could dispose of five or six divisions on the Albanian frontier immediately—she could not hope to hold out for long alone; but such a form of aggression would involve a regular war, and consequently the intervention of the Great Powers and of the League of Nations, and it is very doubtful if any country, however ambitious, would take so grave a step as to break its undertakings under the Covenant. In any case the Albanian army could resist until outside intervention were forthcoming, and this fact alone renders even such a danger even more remote. The creation of this army must therefore be regarded as an important factor for the maintenance of peace in the Balkans.

THE POLISH CORRIDOR AS IT IS¹

By MAJOR E. W. POLSON NEWMAN, B.A., F.R.G.S.

MY recent journey through the "Corridor," which forms the fundamental issue between Germany and Poland, revealed some very interesting facts bearing on the difficulties of the present situation in that territory. During my visits to Thorn, Bromberg, Graudenz, Danzig and Gdingen, I had long conversations with German

¹ In the Contents List of the May number of the R.U.S.I. JOURNAL an article on "A Danger Spot to Europe," by "Inquisitor" was inadvertently attributed to Major Polson Newman.

Major Polson Newman, who has first hand knowledge of conditions in the Corridor, deals in this number with present-day relations between the Poles and Germans in that territory.—EDITOR.

and Polish officials, as well as with representatives of the local inhabitants, and I believe that my impressions are somewhere near the truth.

On the German side I heard chiefly complaints, to which the Poles replied in justification of the policy which they are carrying out. In Thorn, where about five per cent. of the population is German and the German language is still used by many Poles, the chief sources of complaint were:—the expropriation of estates; want of adequate facilities for secondary education in German; censorship of the press; and an unjust system of taxation, by which Poles are often exempt but Germans are always obliged to pay.

With regard to the expropriation of land, the German minority seems to think that the Polish Agrarian Reform Act is specially directed against German landowners, and that in many cases Poles are allowed to retain their property, a privilege that is always denied to Germans. The policy of land expropriation, which is now general throughout the newly formed states of Northern Europe, has caused very considerable hardship to the large landowners, and it so happens that in the "Corridor" the majority of these landowners are German. The fact that the Germans previously bought up so much land in this area, and for this purpose obtained loans floated chiefly in Amsterdam, has caused them to be the principal losers with the unpleasant prospect of these loans possibly being called in. Yet expropriation has become a necessity, as many Polish farms have become so small owing to the land having been split up amongst large families, and without some measure of this kind it is no longer possible for these poor peasants to acquire more land. While it is quite possible that there are cases where the Poles have shown favouritism to their own people, and that certain officials have abused their authority, my impression is that on the whole the Polish Government are trying their best to treat the German landowners in a just and equitable manner.

In the matter of secondary education, the Polish authorities informed me that the Government maintain the German gymnasium at Thorn, as it was before the war, with German teaching, German teachers and German text-books, that the two gymnasia at Graudenz have parallel German classes, and that there are three private schools staffed with German teachers, some of whom even to-day do not speak Polish. Taking into consideration the percentage of Germans in this region, it seems that on paper the number of secondary schools is adequate, but I doubt whether there is yet adequate provision of German teachers or sufficient educational facilities for a community to whom education has a very particular significance. I do not think that the Poles quite realise the needs of the German minority in this direction.

The censorship of the press I have seen with my own eyes; but I have not seen the matter excluded, so it is hard to express an opinion. Yet it seems more than probable that both sides are at fault, the Germans in printing matter distasteful to the Poles, and the Poles in being too drastic in the suppression of articles. I have before me a copy of the *Pommereller Tageblatt*, published at Dirschau, in which an article on "Polish Schools in Prussia and German Schools in Poland" is completely deleted by the censor.

In Bromberg, formerly a very German town but now with a Polish majority, I inquired into the striking change of nationality that had taken place, and found it to be due to the following causes:—the departures of German officials and their replacement by Poles, chiefly from Galicia; the fact that many Poles had previously accepted German nationality for convenience sake; the Polish policy of introducing as many Poles as possible into the "Corridor"; and the general trend of German migrations westward to the large industrial centres of Germany. The Poles have made remarkable progress in accordance with their general policy, especially in the setting up of hospitals, welfare centres, and other social institutions, which are open to all, irrespective of nationality; and it seems to me that Germans and Poles work tolerably well together, except where nationalist tendencies show themselves in an aggressive form. Unfortunately, German nationalism is rather prominent in Bromberg, which probably accounts for certain difficulties experienced by the whole minority there. The Poles are trying to extend their influence, and the Germans are trying to defend their rights in a frontier district where friction is only to be expected, as both attitudes are the result of well thought-out policies framed with a view to determining the future of the "Corridor." Another very natural cause of ill-feeling in Bromberg is the opinion, freely expressed by Poles, that East Prussia will gradually be absorbed by Poland in accordance with the wish of the inhabitants themselves.

When in Graudenz, the most German town in the "Corridor," I visited the industries of agricultural machinery, hardware and rubber goods, and found Poles working well under German foremen. There were no cases of Germans working under Polish foremen, but there was no friction among the workers. It seems to be the "bourgeoisie" element that gives rise to most of the bad feeling between the two peoples. In former times there was no middle class in Poland, and this gap had to be filled by foreigners, so that now the German and Jewish elements of the population clash with the new Polish middle class, which is rapidly developing.

Danzig I found more German than Germany itself. German nationalism is strong, partly owing to the large number of retired civil

servants, and partly to the fact that nationalists are free in Danzig to express themselves in a way that is not possible in Republican Germany. The old imperial colours were conspicuous in several directions. The Danzigers resent Polish influence in the Free City, especially the Polish post office, customs, participation in the harbour control, and railway administration. Owing to the customs barriers most things are expensive, the customs dues being fixed by the Poles to suit Polish interests generally, which far from coincide with the interests of the Danzigers. While Polish goods, which no Danziger wants, are cheap, German goods, which are in great demand, are expensive. This is the natural result of there being no commercial treaty between Germany and Poland, and it is more noticeable in the small state of Danzig than anywhere else. The United States, on the other hand, having a commercial treaty with Poland, are able to import motor cars on favourable terms and are doing so with considerable success.

It seems that the Danzigers are divided in their attitude towards Poland, some following the line of uncompromising hostility while others believe in co-operation, hoping for changed conditions in the future. Although the latter are increasing in numbers and there has recently been an improvement in Polish-Danzig relations, very few Danzigers believe that present conditions are permanent. The Danzig currency is proving a serious drawback to the people, as most goods come from Poland and the purchasing value of the Danzig gulden is reduced to that of the Polish zloty. Similarly, agriculture is at a disadvantage, as it is cheaper to buy Polish produce.

At Gdingen the harbour was ice-bound and all work was at a standstill, but that did not prevent me from appreciating the value of this vast undertaking. Germans in Danzig did not hesitate to praise this remarkable achievement, although there is a general tendency outside Polish circles to doubt whether Polish export trade will be sufficient to maintain the two ports.

CORRESPONDENCE

[Correspondence is invited on subjects which have been dealt with in the JOURNAL, or which are of general interest to the Services. Correspondents are requested to put their views as concisely as possible, but publication of letters will be dependent on the space available in each number of the JOURNAL.—EDITOR].

REGIMENTAL JOURNALS

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—In your last issue there is a paper by Major B. T. St. John on "Regimental Journals," which contains the following statement: "there can be no doubt that a monthly journal is an infinitely better regimental institution than is a quarterly or yearly one." With this assertion I feel sure that nobody, who has had any real working experience of both a monthly and an annual journal, will for one moment agree.

Practically continuously for sixteen years I edited a regimental monthly, while since 1909 I have edited a regimental annual; and I am quite confident that the 2,000 or more subscribers to our annual infinitely prefer it to any monthly, and would not go back on any terms to a monthly were they offered the chance.

The disadvantages of a monthly are first and foremost its very perishable get-up; it is bound in paper; each copy must be kept in hand for from six to twelve months before the (extra) expense of binding can be incurred; while its inconvenient size makes it most difficult to preserve from mutilation or defacement during the vicissitudes of military, and especially of barrack-room, life, until the time for binding the accumulated copies is reached. In proof of this, I would state that I do not believe there are now half-a-dozen complete sets of the monthly journal of my late regiment anywhere in existence.

The annual seems also, judging from Major St. John's figures, to be a less expensive publication than is a monthly, the cost of which he puts at "somewhere in the region of £600 per annum." I find I can give my readers a very fully-illustrated annual of well over 300 pages for "somewhere in the region" of £400, selling moreover paper-bound copies at 2/- or 1/3, the price of Major St. John's monthly of twelve copies. But as a matter of fact, our sale of paper-bound copies is practically negligible, our readers appearing to prefer something free from the perishable qualities of a paper-bound journal. Further, the unquestionable advantage of a strongly bound single book like an annual is that it will survive through and beyond the soldier's Colour service in a way and to an extent which is quite impossible for a monthly publication.

Finally, an annual can, I am truly thankful to find, be run without advertisements. I may be old-fashioned, but I confess that I do *not* like to see—*more Americano*—reading matter and advertisements intermingled—with perhaps on one page an illustrated account of "The Trooping of the Colour," faced by a full-page advertisement of Somebody's Sausages, or of a new brand of Gaspers; or, worse still—an account of the "Unveiling of a War Memorial" sharing a page with an advertisement of a specially stimulating kind of Pickles!

Yours, etc.,

R.U.S.I.,

H. C. WYLLY,

31st May, 1929.

Colonel.

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—In your May issue there is an interesting article by Major B. T. St. John (late Northumberland Fusiliers), dealing with Regimental Journals.

Now, I took a very great interest in that of my own, *The Suffolk Regiment Journal*, and I note that he refers to *The St. George's Gazette* and *The Queen's Own Gazette* as being some of the "earliest endeavours." They are apparently not yet fifty years' old; so I should like to challenge his claim.

On your bookshelves you will find (presented by me) a bound volume of the "12th Foot Regimental Journals," beginning about 1863 or 1864. This is, I believe, one of the oldest journals of the Line (cavalry or infantry), but I am not quite sure whether one of the Guards' Regiments has a slightly older one. I believe not.

I am of opinion that Regimental Journals are far more successful when worked by the battalion abroad. At home there are such hosts of other periodicals and newspapers for the men. Abroad, moreover, there may be men learning the printer's trade, which facilitates things, while there is always more scope for a journal in a stronger battalion. With us when the home battalion goes abroad, it takes over the Regimental Journal and the home serving battalion sends out its news to it.

Finally, I would say that I agree with Major St. John when he says that interest wanes if the journal is not issued *monthly*.

Yours, etc.,

E. MONTAGU,

Colonel.

THE ELIMINATION OF INFANTRY

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—I am glad that your correspondent, "A Thinking Bayonet," has given me the opportunity to call attention once more to a situation which is indicated by the heading to this letter. In your May issue (page 399), he challenges my figures, and challenges them successfully because I wrote the article last year, and new establishments have since appeared which show our "infantry" battalions to consist, at the moment of mobilization, of 34 officers and 806 other ranks with all manner of duties and responsibilities assigned them, from conducting divine service to shoeing horses. The new establishments actually add to the bayonet strength of the unit to the extent of 2 men per section, or 24 per battalion. So far so good; it is a step in the right direction; and I am hopeful that further steps—and longer strides—will be taken in the near future. As regards the Soviet unit it may well be that "A Thinking Bayonet" has access to the 1929 establishments and I must, in such a case, yield to his argument.

I return, however, to my main point, which is that to discharge the manifold duties laid down in *Infantry Training* for riflemen (or "bayonets" as Wellington styled them), only 168 privates per battalion are available—less the inevitable sweating that begins the day after mobilization.¹ My view is, of course, the small-scale view. "The section is the fire unit of the infantry." The larger view

¹ The Rifle Section now consists of 7 privates under one N.C.O.; the company therefore yields 56, the battalion 168 bayonets. Rations are provided for 840 all ranks.—G.W.R.

was taken by the fine intellect that combated the Government's proposals to disband twenty-two battalions seven years ago. Sir Henry Wilson, in his maiden speech in the House of Commons, declared that the Geddes Committee had acted on the supposition that "modern inventions made a given force automatically more formidable than it would have been in times past," and he pointed out that "foreign armies enjoyed the advantage of modern inventions as well as the British, so that the inventions did not in reality affect the question of numbers"; and he added that "experience had proved these inventions to favour irregular as against regular forces." ["Life and Diaries," vol. 2, page 331]. One can imagine the terms in which the Field Marshal would have expressed his opinion of a re-organization that provides only 2,016 bayonets in an infantry division on the day of mobilization. One is reminded of Falstaff's "one half-pennyworth of bread to this intolerable deal of sack."

Yours, etc.,

London,
28th May, 1929.

G. W. REDWAY,
Major (retired).

A FRENCH VIEW

("La Revue d'Infanterie" of June last devoted a number of pages to an eulogistic account of the Royal United Service Institution, and to a review of Major Redway's article and that of Major Blacker on "Mechanized Warfare in Asia," both of which appeared in the February number of our JOURNAL. The following is a summary of the views expressed in regard to these two articles by the French publication.—EDITOR.)

During the last months . . . we have often drawn attention to the impatience of those in favour of mechanization, and it is therefore gratifying to find in the February R.U.S.I. JOURNAL an article entitled "The Elimination of Infantry"; a vigorous counter-attack from a keen infantryman . . . Major G. W. Redway courageously takes up the defence of the bayonet . . . In effect, the crucial problem is how to attack an enemy disposed in depth if infantry, pure and simple, is always being nibbled away by the ceaseless claims of automatic weapons. This is one more reason why we congratulate ourselves on the new organization of the French Infantry, which, thanks to the light automatic rifle of 1924, seems to have attained that equilibrium between methods of fire and methods of movement which are so difficult to achieve.

But the pleading of Major Redway, the advocate of the bayonet, has not prevented Major L. V. Blacker from depicting in the same number of the JOURNAL the future fighting unit in a very different aspect. The chiefs of the British Army, although they may encourage experiments in mechanization, hesitate to take a decisive step towards its wholesale adoption. This is not due so much to the influence of the past as to the fact that they appreciate that the British Army may be called upon to fight in many and various parts of the world; from European battlefields to the North West Frontier of India; from the sandy plains of Egypt to the depths of a tropical jungle. Doubtless it is Major Blacker's object to meet these varying conditions. He therefore desires to see, in addition to mechanized forces, specially equipped mountain troops, which would be supported by aircraft alone.

Now mechanization represents the victory of man over ground; it is logical therefore to exploit that achievement according to the ground. Thus, in Europe,

mechanization may be used to the maximum ; in Asia only in a modified form ; in mountainous regions it must be limited to aircraft. But in our opinion a serious danger lies in this specialisation of fighting units when it comes to the general reserve, whose flexibility is restricted because its units are only suited to certain forms of warfare.

In the light of the experiences of the French Army in Morocco in 1925-1926, one is bound to disagree with the conclusions arrived at by Major Blacker. In that country mechanical vehicles cannot penetrate beyond the main roads in the rainy season, or beyond tracks in the dry season ; whilst, although vehicles equipped with caterpillar tractors can traverse regions where no roads or tracks exist, they are useless on steep slopes. Moreover, in the rocky districts of North Africa the life of caterpillar tractors is short, and if they are to penetrate any distance, frequent refuelling stations are essential. Wheeled and caterpillar vehicles are both dependent on roads, although to a different extent, and in a district where the only road is a single track with no intersecting paths, their radius of action is limited. An infantry force, on the other hand, can penetrate everywhere. Accompanied by its own convoy, it can patrol the most remote and inaccessible regions. Nothing but an aeroplane can equal this, and the action of the latter is intermittent.

On the other hand, the "bled," to give it the correct name, necessitates the employment of a very large force of infantry. Guerilla warfare, as waged by the natives of Africa and Asia, can be more easily repulsed by a mobile force of infantry than by a similar force encumbered by superfluous automatic weapons.

This does not mean that we wish to disparage the tremendous advantages which modern equipment ensures for troops on the march. Lorries, tanks and aeroplanes should be fully exploited to relieve and assist the infantryman, who has more hardships to endure in Africa and Asia than in Europe. But the specialisation demanded by Major Blacker would deprive a force of its potential mobility in action, and our expeditionary forces are too small as it is to cope with the tasks set them. The wisest course for present needs would seem to be the organization of an infantry force adapted to fight over any ground, whether in Europe or the colonies, including hilly country ; and, further, to make every possible use of technical devices, and in particular of mechanized vehicles. In Morocco, where lorries have been extensively used, it was always difficult to save time by means of mechanical transport, because the mule driven vehicles attached to the infantry units were obliged to keep to the roads. The use of cars made only a slight difference to the fatigue suffered by the men, but time might have been saved by an organized mule service, when the drivers could have changed animals at each station.

Both Major Redway and Major Blacker advocate sound measures, though they are sometimes a little extreme in their views. To bring these views more in accord with one another it might be suggested that, if infantry is to keep its place and, above all, to preserve its qualities as an offensive force, it behoves those in command to concentrate on using every means at their disposal to promote the efficiency of the infantryman ; and surely it is by the use of mechanical devices that this can best be effected. It is by combining their efforts that specialists will achieve most in every sphere.

GENERAL SERVICE NOTES

BELGIUM.

INSPECTOR-GENERAL OF AVIATION AND A.A. DEFENCES.

By an *arrêté royal* of the 21st March, 1929, the above named post has been added to the list of Inspectors-General in the Belgian Army.

His duties of inspection extend over all instructional matters connected with aviation and anti-aircraft defences amongst the army formations, schools, services and establishments.

As a permanent subordinate of the Minister of National Defence he is responsible for all statistics regarding aviation and anti-aircraft services during manoeuvres and range exercises. He elaborates the necessary instructions as regards liaison between the aviation and the anti-aircraft defences and decides on the annual training which shall take place for these two formations.

FRANCE.

RE-ORGANIZATION OF THE CONSEIL SUPERIEUR DE LA DEFENSE NATIONALE.

Further details have now been published of the re-organization of the *Conseil Supérieur de la Défense Nationale* and of the formation of a *Commission d'Etudes*.

The expansion of the original organization, outlined in these Notes in the May JOURNAL, is analogous to certain provisions of the draft law for the "Organization of the Nation in time of War," which has for the present been side-tracked. It is interesting to note, however, that this re-organization is effected by decree, not by law and it can therefore be altered if in practice it proves top-heavy.

The following are the Articles of the new Decree of 23rd February, 1929:—

Article 1.—The Council for National Defence is responsible for advising the Government on all important questions relating to national defence, which involve the co-operation of several Ministerial departments.

Article 2.—The composition of the said Committee is similar to that of the Cabinet Council—to whom are added the Vice-Presidents of the Army, Navy and Air Councils, as well as the Vice-President of the Research Committee mentioned below, these latter having only an advisory vote.

Article 3.—A Research Committee known as "The Research Committee for National Defence," is responsible for a preliminary examination of important questions which are to be submitted to the Council for National Defence, and is to propose to the Government a solution of inter-ministerial questions.

A permanent Secretariat, known as the "Secretariat General for National Defence," is responsible for the preparation of the said questions.

Article 4.—The "Research Committee for National Defence" works under the direction of the President of the Council, who appoints the Vice-President. It includes :

- The Vice-President, appointed by the President of the Council.
- A Councillor of State, representing the Keeper of the Seals, Minister of Justice.
- The Secretary General, or the Director of Political and Commercial Affairs at the Ministry for Foreign Affairs.
- The Head of the Police (*Le Directeur de la sûreté générale*), and the Director of Algerian Affairs, at the Ministry of the Interior.
- The Director of Commercial and Industrial Affairs and the Director of Liquid Fuels at the Ministry of Commerce and Industry.
- The Director of Agriculture.
- The Chief of the General Staff (or a deputy Chief).
- The Chief of the Naval Staff (or a deputy Chief).
- The Chief of Staff of the National Air Service (or a deputy Chief).
- The General Officer, President of the Advisory Committee for Colonial Defence.
- A high official representing each of the Ministries and Under-Secretaries of State concerned.
- The General Officer, mentioned below, Secretary General for National Defence, and reporter to the Committee.
- The high officials representing Ministries and Under-Secretaries of State on the Committee are appointed by decree issued by the President of the Council, on the recommendation of the Ministers concerned.

Article 5.—The "Council for National Defence" and the "Research Committee for National Defence" may summon, for purposes of consultation any civil or military persons who may be helpful to them in their work.

Article 6.—The General Secretariat of National Defence is responsible for :

- (1) Centralization of all questions to be submitted to the Council for National Defence, or the Research Committee.
- (2) Preparing, co-ordinating and carrying out all preliminary research for these questions ; compiling the reports to be submitted to the Research Committee and the Council of National Defence, drawing up the minutes of the meetings ; keeping the national defence archives.
- (3) Notifying ministerial departments of decisions made by the Government, following opinions expressed either by the Research Committee, or the Council for National Defence, and following up the execution of these measures, in the name of the President of the Council.

Article 7.—The General Secretariat for National Defence—the composition of which is laid down by Decree of the President of the Council—is directly subordinate to the latter, who is assisted by a General Officer appointed on the recommendation of the Minister for War, to direct the work of the Secretariat. This General Officer is known as the Secretary General for National Defence ; an Assistant Secretary may also be appointed.

Article 8.—Research Committees and permanent Secretariats for National Defence are organized in North Africa and the Colonies, upon application from Governors and Residents General.

Questions dealt with by these bodies, which require Government authority, are submitted for consideration to the Council for National Defence.

NAVY NOTES

GREAT BRITAIN.

THE ADMIRALTY BOARD.

In the list of members of the Ministry formed by the Right Hon. Ramsay MacDonald in the first week of June, Mr. A. V. Alexander was nominated First Lord of the Admiralty. He is forty-four, and has been M.P. for the Hillsborough Division of Sheffield since 1922. He served in the Army during the late War, and was granted the honorary rank of Captain. In the Labour Ministry of 1924, he was Parliamentary Secretary, Board of Trade.

Mr. C. G. Ammon, M.P., has been re-appointed to his former post of Parliamentary and Financial Secretary, and Mr. George Hall, M.P., is the new Civil Lord.

Mr. Alexander made his first visit to the fleet after taking office on 8th July, when he went to Torbay, where the Atlantic Fleet had assembled for the annual sailing regatta. On 19th July, he was the guest, in company with the civil members of the Board and the Adjutant-General of Marines, of the Royal Navy Club at dinner, when Admiral-of-the-Fleet Earl Jellicoe presided.

In a speech at Sheffield on 5th July, referring to the disarmament question in relation to the United States, Mr. Alexander said that people need have no fear that a Labour Administration would rush to sacrifice security. What they could depend on was that a Labour Government would work might and main, first for the stabilization of naval armaments at a given point, and then for a reduction which would give us security, backed by arbitration, without the great drain on our economic resources that we had to-day.

In a further speech at Sheffield on 13th July, in the week of the loss of "H.47," Mr. Alexander said he hoped in the future that there would be an international agreement to ban submarines altogether. To the credit of this country, such a proposal was made years ago by Britain, but it had not been possible to achieve international agreement on the matter. He hoped that the last had not been heard of determined efforts to abandon this method of warfare. Apart from the inhumanity of it, it would be an immense saving, as the cost of a number of destroyers needed for defence against submarines would be saved.

FLAG RETIREMENTS AND PROMOTIONS.

Owing to the vacancy created in the list of rear-admirals due to the loan of Rear-Admiral E. R. G. R. Evans, C.B., D.S.O., to the Royal Australian Navy on 17th May, the following promotions and retirements were approved:—Captain W. J. C. Lake to be Rear-Admiral, 17th May, and placed on the retired list, 18th May; Captain the Hon. Arthur Stopford, C.M.G., to be Rear-Admiral, 18th May, and placed on the retired list, 19th May; following the promotion of Captain Stopford, Captain H. E. F. Aylmer, C.B.E., retired, to be Rear-Admiral, retired; Captain R. A. Hornell, D.S.O., to be Rear-Admiral, 19th May, and placed on the retired list, 20th May; Captain G. O. Stephenson, C.M.G., to be Rear-Admiral, 20th May, and placed on the retired list, 21st May; and Captain J. L. Pearson, C.M.G., to be Rear-Admiral, 21st May.

On 23rd May, Vice-Admiral W. M. Ellerton, C.B., retired, at his own request, whereby Rear-Admiral J. E. Cameron, C.B., M.V.O., was promoted to Vice-Admiral, 23rd May, and placed on the retired list, 24th May; Captain J. W. Carrington, D.S.O., to Rear-Admiral, 23rd May; Rear-Admiral C. S. Townsend, C.B., to Vice-Admiral, 24th May; and Captain B. M. Money, D.S.O., to Rear-Admiral, 24th May; while Rear-Admiral C. D. S. Raikes, C.B.E., retired, was promoted to Vice-Admiral, retired, 23rd May.

Vice-Admiral C. S. Townsend, C.B., was placed on the retired list, to date 25th May, and in consequence, Rear-Admiral C. M. Staveley, C.B., C.M.G., was promoted to Vice-Admiral, 25th May, and placed on the retired list, 26th May; Captain W. F. French, C.M.G., to Rear-Admiral, 25th May; Rear-Admiral Frank Larken, C.B., C.M.G., to Vice-Admiral, 26th May; and Captain L. W. Braithwaite, C.M.G., to Rear-Admiral, 26th May. Rear-Admirals (retired) J. E. T. Harper, C.B., M.V.O., J. D. Allen, C.B., and R. G. D. Dewar, C.B.E., were promoted to Vice-Admirals on the retired list, 26th May.

Rear-Admiral L. W. Braithwaite, C.M.G., was placed on the retired list, to date 27th May, and Captain T. N. James, M.V.O., was promoted to Rear-Admiral; Captain F. A. W. Buller, D.S.O., retired, was promoted to Rear-Admiral, retired, 27th May.

In the vacancy created by the transfer to the supernumerary list, on 31st July, of Admiral of the Fleet Sir Charles Madden, Bart., G.C.B., G.C.V.O., K.C.M.G., D.C.L., LL.D., Admiral Sir Osmond de B. Brock, G.C.B., K.C.M.G., K.C.V.O., was promoted to Admiral of the Fleet. In consequence of this promotion, the following changes took place on the Flag List: Vice-Admiral Sir Michael H. Hodges, K.C.B., C.M.G., M.V.O., to be Admiral; Rear-Admiral W. R. Napier, C.B., C.M.G., D.S.O., to be Vice-Admiral, and placed on the retired list to date 1st August; Rear-Admiral H. W. Bowring, C.B., D.S.O., to be Vice-Admiral; and Captain R. M. Colvin, C.B.E., A.D.C., to be Rear-Admiral, both to date 1st August; Rear-Admiral R. M. Burmester, C.B., C.M.G., to be Vice-Admiral; and Captain R. S. Wykes-Sneyd, D.S.O., A.D.C., to be Rear-Admiral, both to date 2nd August; Rear-Admiral Wykes-Sneyd placed on the retired list, from 3rd August; Captain A. F. B. Carpenter, V.C., A.D.C., to be Rear-Admiral, 3rd August, and placed on the retired list, 4th August; Captain K. G. B. Dewar, C.B.E., A.D.C., to be Rear-Admiral, 4th August, and placed on the retired list, 5th August; Captain A. K. Betty, D.S.O., A.D.C., to be Rear-Admiral, 5th August, and placed on the retired list, 6th August; and Captain H. S. Monroe, D.S.O., A.D.C., to be Rear-Admiral, 6th August.

FLAG APPOINTMENTS.

COMMANDER-IN-CHIEF, PLYMOUTH.—It was announced on 8th May that Admiral the Hon. Sir Hubert G. Brand, K.C.B., K.C.M.G., K.C.V.O., is to be Commander-in-Chief, Plymouth Station, in succession to Admiral Sir Rudolf W. Bentinck, K.C.B., K.C.M.G., to date 8th October.

REAR-ADMIRAL, ROSYTH.—Rear-Admiral T. J. Hallett, C.B.E., has been appointed Rear-Admiral and Commanding Officer, Coast of Scotland, in succession to Vice-Admiral John E. Cameron, C.B., M.V.O., to date 4th July.

EAST INDIES COMMAND.—Rear-Admiral E. J. A. Fullerton, C.B., D.S.O., M.A., has been appointed Commander-in-Chief, East Indies Station, in succession to Vice-Admiral B. S. Thesiger, C.B., C.M.G., to date 18th October.

ORDER OF THE BRITISH EMPIRE.—The King has appointed Admiral Sir Herbert Leopold Heath, K.C.B., M.V.O., to be King of Arms of the Order of the British Empire, in the room of the late General Sir Arthur Henry Fitzroy Paget, G.C.B., K.C.V.O.

MATERIAL.

NEW WARSHIP NAMES.—The following names have been given to ships of the 1928 programme:—"A" class cruisers, "Surrey," at Portsmouth; "Northumberland," at Devonport; Flotilla leader, "Keith," at Vickers-Armstrongs, Barrow; Destroyers (to be known as the "Beagle" class), "Basilisk" and "Beagle," John Brown, Clydebank; "Blanche" and "Boadicea," Hawthorn Leslie, Newcastle-on-Tyne; "Boreas" and "Brazen," Palmers, Hebburn-on-Tyne; and "Brilliant" and "Bulldog," Swan Hunter and Wigham Richardson, Wallsend-on-Tyne; Sloops, "Hastings" and "Penzance," Devonport Dockyard; "Folkestone" and "Scarborough," Swan Hunter, Wallsend; Submarines, "Rainbow," Chatham Dockyard; "Regent," "Regulus," and "Rover," Vickers-Armstrongs, Barrow; "Royalist," Beardmore, Dalmuir; and "Rupert," Cammell Laird, Birkenhead; Submarine depot-ship, "Maidstone," Chatham Dockyard; Gunboat, "Falcon," to be built by contract.

NEW CONSTRUCTION SUSPENDED.—On 24th July, 1929, the Prime Minister announced in the House of Commons that, after a thorough examination of the naval position, it had been decided to suspend all work on the cruisers "Surrey" and "Northumberland"; to cancel the submarine depot-ship "Maidstone"; to cancel two contract submarines; and to slow down dockyard work on other naval construction. As regards the 1929-30 programme, no steps will be taken to proceed with it until the matter has received further consideration.

(See also "INTERNATIONAL SITUATION," page 612).

SHIPS DUE FOR COMPLETION.—Cruisers approaching completion are the "Shropshire," which should be ready in September to relieve the "Frobisher" in the Mediterranean; the "York," due in March, the "Norfolk," in April, and the "Dorsetshire," in July, 1930.

Of the six submarines in the 1926 programme, the "Osiris" was completed on 3rd June; the "Otus" was commissioned on 5th June; and the "Oswald" was due to be completed on 17th August, all at Barrow, for service on the China Station. The "Odin," built at Chatham, commissioned on 8th July for trials, and service on the China Station. The "Olympus" and "Orpheus," on the Clyde, are due for completion at the end of October and end of December respectively.

The repair ship "Resource," to relieve the "Assistance" in the Mediterranean, should be completed at Barrow by the end of October. The submarine depot-ship "Medway" was commissioned at Barrow on 3rd July with a party from Chatham, for passage to Devonport, where she was to be docked prior to acceptance from the contractors. She will relieve the "Titania" in China, and will proceed there, accompanied by the first four of the six submarines mentioned, via South America.

NEW DESTROYER FLOTILLAS.—The Destroyer Flotillas in the Mediterranean Fleet will be relieved by the first four new construction flotillas in the following order:—1930, Third Flotilla; 1931, Fourth Flotilla; 1932, First Flotilla; and 1933, Second Flotilla. The "Amazon" and "Ambuscade," completed in 1927, will not be reduced to reserve with the rest of the Third Flotilla, but will relieve

two vessels of the Fourth Flotilla. Their disposal in 1931 will be considered six months before the relief of the Fourth Flotilla is due.

DESTROYER LAUNCHES.—The eight destroyers of the 1927 programme, ordered and laid down in 1928, are now at the launching stage. The "Anthony" was put afloat on 24th April, and the "Ardent" on 26th June, both at the Scott's Yard, Greenock, without ceremony. The "Active" was launched on 9th July, and the "Antelope" on 27th July, both at the Hawthorn Leslie works, Newcastle-on-Tyne. The "Acasta" and "Arrow" were due to be launched in August, the "Achates" in October, and the "Acheron" in December.

SUBMARINE LAUNCHES.—The six submarines of the 1927 Navy Estimates are also being launched. The "Perseus" was put afloat on 22nd May, the "Poseidon" on 21st June, and the "Proteus" on 23rd July. All these were at the Barrow works of Vickers-Armstrongs, Ltd., where the "Pandora" is due to be launched on 22nd August. The "Phoenix," at Cammell Laird's, Birkenhead, is due to be launched in September.

PERSONNEL.

RETIREMENT SCHEME FOR LIEUTENANT-COMMANDERS.—A further retirement scheme for the reduction of the surplus on the Lieutenant-Commanders' list was announced by the Admiralty on 3rd May. Lieutenant-Commanders, R.N., other than those promoted from warrant rank, but including ex-Mates and officers on the Supplementary List, who will have attained the age of compulsory retirement (45) by 31st December, 1933, may, at the discretion of the Admiralty, be permitted to retire voluntarily forthwith, with the rate of retired pay for which they would have been eligible under the ordinary regulations if they had remained on the Active List and had been employed continuously until reaching the age of 45. Applications must be submitted within a period of six months from the date of the order.

FULL DRESS UNIFORM.—It has been decided, with the King's approval, that from 1st July, 1930, all officers of Commander's rank and above shall be required to provide themselves with full dress uniform. Exceptions are made for Commanders who have more than four years' seniority on 1st July, 1930; for non-executive officers of Commander's rank who are within five years of retirement on that date; and for all officers below the rank of Commander, for whom full dress will continue to be optional, except at State balls.

GEDGE MEDAL AND PRIZE.—Members of the R.N. Accountant Officers Dining Club have subscribed a sum of £260 to institute a prize to be awarded annually to the Paymaster Sub-Lieutenant who has passed the examination for that rank at the first attempt and has obtained the highest percentage of the total maximum marks in these examinations during the current year. The prize will consist of books and a medal, the latter known as the "Gedge Medal," after the late Staff-Paymaster Joseph T. Gedge, R.N., killed on 6th August, 1914, when the "Amphion" was sunk by a mine, and the first British officer of all the fighting Services to be killed in the late war. Particulars of the award are given in A.F.O. 1456/29.

OGILVY MEDAL AWARD.—The Ogilvy Gold Medal for 1929, offered for first place in the examination to qualify for torpedo lieutenant, has been awarded to Lieutenant G. B. Sayer, R.N.

COMMANDER EGERTON PRIZE.—Lieutenant R. P. Clarke has been awarded the Commander Egerton Memorial Prize for 1929, offered annually to the officer who,

when qualifying for gunnery lieutenant, passes the best examination in practical gunnery.

GILBERT BLANE MEDAL.—The Gilbert Blane Medal for 1929 has been awarded to Surgeon Lieutenant-Commander T. N. D'Arcy, R.N., of H.M.S. "Queen Elizabeth." This is the oldest of the various prizes and testimonials for the encouragement of naval officers in their studies, and next year (1930) will reach its centenary. It was established by Sir Gilbert Blane, a member of the Board for Sick and Wounded Seamen, in 1830.

BEAUFORT AND WHARTON TESTIMONIALS.—The Beaufort and Wharton Testimonials for the year 1928 have been awarded to Sub-Lieutenant A. L. Taylor, R.N., of H.M.S. "Effingham." These are offered annually to the officer passing the best examination in navigation and pilotage for the rank of Lieutenant, R.N.

ADVANCED (G) AND (T) PRIZES.—A prize of £20 has been awarded to Lieutenant A. G. V. Hubback, R.N., H.M.S. "Renown," on the result of the final examination held on the completion of the advanced gunnery course at the R.N. College, Greenwich, in March last. A similar prize of £20 has been awarded to Lieutenant B. J. Fisher, R.N., H.M.S. "Frobisher," on the result of the final examination held on the completion of the advanced torpedo course at the College.

EXERCISES AND CRUISES.

ATLANTIC FLEET.—The Atlantic Fleet, under Vice-Admiral Sir Ernle Chatfield, proceeded to Cromarty Firth from 4th May to 3rd June, for exercises, including some with military and air forces. Squadrons and flotillas then went to Scapa Flow until the 8th, where the pulling regatta was held, after which they dispersed for independent cruises. The Second Cruiser Squadron and Fifth Destroyer Flotilla made the usual cruise to the Baltic, visiting Copenhagen, Helsingfors, Stockholm, Riga, Tallinn, and Oslo, among other places. The Fleet reassembled in Torbay for the sailing regatta from 5th to 12th July.

MEDITERRANEAN FLEET.—The Mediterranean Fleet under Admiral Sir Frederick Field left Malta on 26th June for its summer cruise eastward. After visiting the Gulf of Patras and Dragomesti Bay, the ships dispersed for various ports, and were to reassemble at Argostoli from 10th to 19th August. The flag of the Rear-Admiral Commanding, First Cruiser Squadron, was transferred from the "Frobisher" to the "London" on 4th April. The "Sussex," after working up at Gibraltar, joined the Fleet on 22nd June at Malta. The "Devonshire," after repairs at Gibraltar, left on 8th July, and was at Malta from the 11th to 19th, joining the Fleet at Skiathos on 22nd July.

AMERICA STATION.—While the "Despatch," flagship of Vice-Admiral Sir Cyril Fuller, and "Capetown," accompanied by the sloops "Heliotrope" and "Wistaria," have been in the North Atlantic off the Canadian and Newfoundland coasts during the past quarter, the other three cruisers have been carrying out independent programmes. The "Caradoc" has been off the coast of Chile, visiting Talcahuano, Coronel, Valparaiso, and other ports, and was to come round into the Atlantic via the Straits of Magellan in August. The "Durban" has cruised down the south-east coast of America, visiting Montevideo and a number of other ports. She was due to meet the "Caradoc" at Dungeness from 5th to 9th August, and to cruise up the West coast. The "Colombo" has been in British Columbia waters during the quarter, visiting Prince Rupert, Nanaimo, Ladysmith, Comox, Vancouver, and other places.

EAST INDIES STATION.—The "Effingham," flagship of Vice-Admiral B. S. Thesiger, has been in African waters, off Zanzibar, Tanga, Mombasa, etc., and was due at Colombo on 1st August. The "Emerald" left Colombo on 16th June for the Seychelles, and East African ports, joining the flagship at Mombasa on 18th July. The "Enterprise" was at Trincomalee or Colombo, following her return from England after recommissioning.

AFRICA STATION.—The "Calcutta," flagship of Rear-Admiral R. M. Burmester, made a cruise to Port Elizabeth, East London, Beira, Lourenço Marques, Durban and Mossel Bay from May to July. The "Lowestoft," the last coal-burning cruiser in full commission, left Simonstown on 7th June for Mossel Bay, Port Elizabeth, East London and Durban, on her last cruise before leaving the Station. She is due at Devonport on 27th August. The cruiser "Carlisle" is to replace her.

VISIT TO BELGIUM.—Prince Charles of Belgium, who is an honorary Lieutenant in the Royal Navy, on 30th May paid a visit to the Training Half Flotilla of the Fifth Submarine Flotilla from Portsmouth, which was on a visit to the port of Ghent. He was received by Commander R. W. Blacklock, D.S.C., on board the "Alecto." The Flotilla included "H" 28, 30, 31, 34 and 48, and "L" 11. It visited Harwich and Yarmouth before returning to base.

NORTHERN CRUISE.—On 23rd May, the First Minesweeping Flotilla, under Commander H. C. Mayo, in the "Pangbourne," left Portland for an extended cruise up the West coast and to Norwegian ports, to last seven weeks.

LOSS OF "H.47."

Submarine "H.47" was sunk on 9th July, off the Pembrokeshire coast, about twenty miles west of Fishguard, after a collision with submarine "L.12."

Both vessels were cruising on the surface, following exercises by about twenty submarines of the Fifth and Sixth Flotillas off Lamlash, and the collision occurred at 8.10 a.m. "L.12" struck "H.47" on the port side at right angles, just abaft the foremost control-room bulkhead, the bow penetrating about two feet. "H.47" sank in a few seconds, considerably down by the bow, in a depth of 55 fathoms. Orders had been given to close water-tight doors and abandon ship, but from the evidence of the commanding officer, Lieutenant R. J. Gardner, and the two ratings who escaped from the control room, it does not appear that the doors could have been closed at the time.

"L.12" was carried down 40 feet at an angle of approximately 50 deg. The captain, and those officers and men who were on deck were thrown into the sea, and a considerable amount of water entered the submarine before hatches could be closed. There was no possibility of any of the crew of "H.47" having remained alive for more than a very few minutes.

Counting one rating of "L.12" who died of injuries, the loss of life was twenty-four; this included one officer, Lieutenant Noel Askew Bickmore, second-in-command of "H.47." The Rear-Admiral Commanding Submarines, Rear-Admiral H. E. Grace, C.B., arrived at Pembroke Dock at 5 a.m. on 10th July in the destroyer "Tilbury," to take charge of salvage operations, but it was impossible to proceed with them owing to the bad weather, and next day it was announced, that after full consideration of the circumstances, it had been decided to abandon all further operations. H.M.S. "Rodney," flying the flag of the Rear-Admiral (S), and accompanied by an appropriate escort, stopped at sunset over the spot where the lost vessel disappeared, and paid their last respects to those who had lost their lives.

DETONATOR EXPLOSION IN H.M.S. "VINDICTIVE."

On 23rd July, an engine-room artificer was killed and two stokers seriously injured by an explosion which occurred on board H.M.S. "Vindictive" at Chatham. The accident occurred whilst a bomb detonator was being prepared for exhibition at the forthcoming Navy Week.

GUN ACCIDENT IN H.M.S. "DEVONSHIRE."

On 26th July, a serious gun accident occurred on board H.M.S. "Devonshire" during firing practice off Skiathos. The first list of casualties showed that Captain John A. Bath, D.S.C., Royal Marines, and eleven other ranks, R.M., were killed or died of wounds, and thirteen men, marines and naval ratings, were injured. Further deaths from injuries increased the total killed to seventeen. In a statement issued on 30th July, the cause of the accident was attributed to a hangfire of a very short duration in one gun of an 8-in. turret. Owing to the simultaneous discharge of the other guns in the ship, including the other gun in the same turret, it was probably momentarily thought by the gun number controlling the breech mechanism that the gun in question had also fired, and the operation of reloading was begun. It appears probable, added the statement, that the mistake was almost immediately discovered, but before it could be fully rectified the charge in the gun exploded and blew out the partially unlocked breech-block. The great force of the explosion also ignited cordite charges waiting in the containers to be loaded for the next round. The "Devonshire" was ordered to England to effect repairs.

FLEET AIR ARM.

RESCUE OF SPANISH AIRMEN BY H.M.S. "EAGLE."—A request having been received from the Spanish Government for assistance in the search for Commandant Franco and his companions in the "Numancia" flying boat, who left Cartagena on 21st June to fly the Atlantic via the Azores, the aircraft-carrier "Eagle," Captain Noel F. Laurence, D.S.O., joined in the search at 5.30 a.m. on 25th June. Her aircraft made a dozen flights daily on either side of the line between Cape St. Vincent and the Azores, and at early dawn on 29th June the special watch kept by an officer and four men aloft in the ship sighted a feeble light which proved to be the missing aircraft. It was in Latitude 36.28 N., Longitude 26.14 W. The airmen and their machine were picked up and conveyed to Gibraltar. Lieutenant Kilroy, R.N., was the first on board the "Eagle" to see the light shown by the "Numancia."

PRIZE ESSAY.—The Henry Leigh Carlslake Prize for the year 1929 has been awarded to Lieutenant Vincent Edward Kennedy, Royal Australian Navy, at present serving in H.M.A.S. "Albatross."

ROYAL NAVAL RESERVE.

PROMOTION TO LIEUTENANT.—It has been decided to modify the qualifications required for promotion to the rank of Lieutenant, R.N.R., of officers who have not performed twelve months' naval training as Sub-Lieutenants. Instead of three years' service actually at sea, these officers will be required to have attained three years' seniority, including acting or probationary time, and to have served not

less than two years at sea whilst holding the rank of Sub-Lieutenant, R.N.R., acting, probationary, or confirmed, service on articles in the Mercantile Marine and all time under naval training to count. The change is effective from 3rd April, 1929.

APPOINTMENTS FOR COURSES.—A Fleet Order, dated 10th May, notified that no personal appointments will in future be sent from the Admiralty (C.W. Branch) to R.N.R. officers appointed for courses or training afloat. Directions as to taking up such appointments will be sent direct to them, as hitherto, in the form of an appointment from the Admiral Commanding Reserves. All appointments for courses and training will as hitherto be published in the daily list of appointments, extracts from which are communicated by Commanders-in-Chief and senior officers to all ships and establishments concerned.

"WORCESTER" CADET COLLEGE.—Lieutenant-Commander Gordon Steele, V.C., R.N., an old "Worcester" boy, was in June appointed Captain-Superintendent of the Thames Nautical Training College in that ship, in succession to the late Captain M. B. Sayer, C.B.E., R.N.R.

ROYAL NAVAL VOLUNTEER RESERVES.

HONOURS.—Captain H. J. Craig, V.D., R.N.V.R., Commanding Officer of the Tyne Division, was appointed C.B.E., in the last Birthday Honours.

Signal Boatswain C. A. Jezzard, R.N.V.R., of the Sussex Division, was appointed M.B.E., in the last Birthday Honours. This is the first R.N.V.R. Warrant Officer to be signalled out for such a reward.

INSPECTIONS BY ADMIRAL COMMANDING RESERVES.—Vice-Admiral Sir A. A. M. Duff, K.C.B., recently inspected the Mersey, London and Tyne Divisions.

TYNE DIVISION.—A Royal Guard of Honour for H.R.H. The Prince of Wales was provided by the Tyne Division on the occasion of his opening the North-East Coast Exhibition on the 14th May, 1929.

ROYAL MARINES.

NEW AIDE-DE-CAMP.—In pursuance of His Majesty's pleasure, Colonel Commandant (temporary Brigadier) R. V. T. Ford, C.B., C.B.E., has been appointed a Royal Marine Aide-de-Camp to the King, in place of Colonel Commandant (temporary Brigadier) A. G. Little, C.M.G., promoted to Major-General, to date 16th June.

PROMOTIONS.—Lieutenant-General F. C. Edwards was placed on the retired list on 16th June, on account of non-service. Consequent thereon, Major-General R. C. Temple, C.B., O.B.E., was promoted to be Lieutenant-General; Colonel Commandant A. G. Little, C.M.G., to be Major-General; Colonel Second-Commandant H. A. H. Jones to be Colonel Commandant (temporary Brigadier); Lieutenant-Colonel and Brevet Colonel R. F. C. Foster, C.M.G., D.S.O., to be Colonel Second-Commandant (with seniority as Colonel, 3rd June, 1921); Lieutenant-Colonel G. R. S. Hickson, C.B.E., to be Colonel Second-Commandant; Lieutenant-Colonel B. C. Gardiner, C.B., to be Colonel Second-Commandant (with seniority as Colonel, 3rd June, 1921); and Major A. G. B. Bourne, D.S.O., M.V.O., to be Lieutenant-Colonel.

DOMINION NAVIES.**ROYAL AUSTRALIAN NAVY.**

FIRST NAVAL MEMBER.—The date of the appointment of Rear-Admiral W. M. Kerr, C.B.E., as First Naval Member of the Commonwealth Naval Board has been amended to 31st August.

REAR-ADMIRAL COMMANDING.—Rear-Admiral E. R. G. R. Evans, C.B., D.S.O., assumed command of the Australian Squadron on 17th May, in succession to Rear-Admiral G. F. Hyde, C.V.O., C.B.E., R.A.N. The flagship "Australia" left Sydney on 27th May to join the Squadron at Hervey Bay, on its autumn cruise.

INTER-DOMINION CRUISE.—The New Zealand cruisers "Dunedin" and "Diomedé" left Auckland on 5th June and arrived on 10th June at Hervey Bay for combined exercises with the Australian Squadron. Afterwards the New Zealand ships visited Brisbane, Sydney, Jervis Bay, Melbourne and Hobart.

ROYAL CANADIAN NAVY.

NEW DESTROYERS.—The Canadian Government have chosen the names of the rivers Saguenay and Skeena for the two destroyers which are under construction for them by Messrs. John I. Thornycroft & Co., Ltd.

ROYAL INDIAN MARINE.

NEW SLOOP.—A contract for the building of a sloop for the Royal Indian Marine has been placed with Swan Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne. It was officially announced on 5th July that this ship will be called the "Hindustan."

FOREIGN NAVIES**CHILE.**

BATTLESHIP FOR REFIT.—The battleship "Almirante Latorre," formerly H.M.S. "Canada," arrived at Devonport on 24th June to be refitted by the Dockyard. This was stated to be the first occasion in the history of the yard that the refitting of a foreign battleship had been undertaken. Vickers-Armstrongs, Ltd., have received an order for new turbine machinery for the "Almirante Latorre."

SUBMARINE DELIVERED.—On 19th June, the submarine "Capitan O'Brien" was handed over to the Chilean Government at Barrow, and accepted by Admiral Luis Escobar, Chief of the Chilean Naval Commission, who in his speech referred to the time-honoured connection of Britain and Chile on the sea.

CHINA.

BRITISH NAVAL MISSION.—The British Foreign Office announced on 1st July that an agreement has been signed between the British and Chinese Governments providing for the training of Chinese Naval Cadets in England, and the engagement by the Chinese Government of a British Naval Mission to assist in the development of the Chinese navy. It is understood that the Chinese Government have a comprehensive programme for the building of a substantial navy, and it is their

intention to have some vessels constructed in Great Britain. Admiral Chen who at present commands the Chinese fleet, was himself trained in the British Navy.

DENMARK.

SUBMARINES AT PORTSMOUTH.—Four submarines, the "Daphne," "Flora," "Dryaden" and "Bellona," accompanied by the depot-ship "Henrik Gerner," visited Portsmouth from 5th to 10th June, under the command of Captain J. Wolfhagen.

MISSING TRAINING SHIP.—The cadet training ship "Köbenhavn," with sixty cadets on board in addition to her crew, left Montevideo on 14th December, 1928, for Australia, and has not since been heard of. Attempts to find her by vessels visiting likely areas south of her course proved fruitless, in spite of the help given by the British Admiralty and other authorities. The Blue Funnel liner, "Deucalion," which searched the Prince Edward Group and other islands in the vicinity of Kerguelen, carried a Lieutenant and several ratings lent from the Royal Navy on the Africa Station.

FRANCE.

TRANSFER OF BATTLESHIPS.—The battleships "Voltaire" and "Diderot" are to be transferred from the Mediterranean to Brest during 1929.

MINELAYING IN SUBMARINES.—According to the Paris Correspondent of the *Morning Post*, the submarine "Turquoise," recently launched at Toulon, is fitted to carry thirty-two mines in wells in the outer ballast tanks, from which they are released directly. On release, the weight of a crab-shaped anchor, to which the mine is attached, carries it to the bottom, whilst the submarine is getting clear. An automatic catch then releases the mine, and allows it to rise until its ascent is stopped by the cable joining, the length of which has been previously adjusted. At the same time, the safety firing arrangement, which prevents a premature explosion, automatically ceases to act.

FLOTILLA LEADER'S TRIALS.—Following the fine performance of the flotilla leader "Guepard," in March, referred to in the last JOURNAL, of 38.45 knots on trial, her sister ship, the "Valmy," developed a speed of 39.85 knots on trial off Lorient. These vessels were designed for 36 knots, with 70,000 horse-power.

FLAGSHIP IN CHINA.—The pre-war armoured cruiser "Waldeck Rousseau" left Toulon in May for the Far East, to act as flagship in succession to the "Jules Michelet." She called at Singapore in June.

GERMANY.

THE NEW ARMoured SHIP.—With the passing by the Reichstag on 19th June of the Naval and Military Estimates, including the second instalment for the 10,000-ton armoured ship "A," in spite of a Communist motion to refuse this credit, there is no further doubt about the progress of the new ship. The vessel was laid down at the end of last year. Details of her design appeared in the two previous issues of the JOURNAL.

GREECE.

BRITISH MISSION.—The new British Naval Mission to Greece, under Captain G. H. D'Oyly Lyon, R.N., arrived at Athens on 29th May. President Konduriotis received the late Chief of the Mission, Captain C. E. Turler, R.N., on 31st May,

and at a farewell banquet thanked him and his officers for the zeal with which they had served Greece for the past two years. The *Times* Correspondent at Athens said: "The Mission, which has achieved deserved popularity for its work in training the Fleet, and for Commander de Pass's direction of the Naval Academy, has received many expressions of goodwill from the officers of the destroyers and submarines on which the country now relies for the defence of its coasts and islands."

ARMoured SHIPS.—It was reported at the end of May that the Greek Government intends to offer for sale the two battleships "Kilkis" and "Lemnos." At a conference of senior naval officers and ministers held at Athens in May, respecting the relative advantages of heavy and light units, Captain Turle is reported to have stated that the requirements of Greece would be met by light units, reinforced by her naval air force.

ITALY.

MEDITERRANEAN CRUISES.—In the course of their spring cruises, in the Western and Eastern Mediterranean respectively, the First and Second Squadrons of the Italian Navy called at British ports. The "Quarto," "Pantera" and eight destroyers visited Gibraltar on 16th to 19th June, the submarine depot ship "Pacinotti" and eight submarines from 21st to 26th June; and the cruisers "Ancona," "Bari," "Taranto," "Tigre" and eight destroyers, from 1st to 4th July. The battleships "Doria" and "Duilio" and a destroyer flotilla visited Alexandria from 22nd to 30th June, and Jaffa from 1st to 4th July. The cruisers "Venezia," "Mirabello" and "Riboty" and twelve destroyers also took part in the Alexandria visit on the former dates.

PARAGUAY.

Two gunboats of 750 tons are being built in Italy for Paraguay. They will be called "Commodore Meza" and "Capitan Cabral," and will be armed with two 4.7-inch 50 calibre guns, mounted in a twin turret, and three 3-inch anti-aircraft guns.

PERU.

The President is reported to be anxious to modernise the navy. The recent acquisition by Chile of six destroyers has no doubt stimulated the desire to follow suit, so far as financial conditions will permit.

The fleet now cruises during January, February and March, visiting Peruvian ports. The remainder of the year is devoted to gunnery and torpedo exercises.

In the early part of the present year aircraft practised W/T communication with the ships with successful results.

Two small submarines, "R.I" and "R.II," of 576 surface displacement, built by the Submarine Boat Corporation of the United States, have been delivered, and two more of the same type are under construction.

UNITED STATES.

FLAG CHANGES.—The following changes in naval flag commands were announced to take effect during the early summer:—Admiral Henry A. Wiley, from Commander-in-Chief, United States Fleet, to General Board; Rear-Admiral Harley H. Christy, from Commandant, 15th Naval District, to command Battleship Division 3; Rear-Admiral Henry V. Butler, from Chief of Staff, United States

Fleet, to command Aircraft Squadrons, Battle Fleet; Rear-Admiral Frank H. Clark, from Command Destroyer Squadrons, Scouting Fleet, to command Light Cruiser Division 3; Rear-Admiral J. R. Y. Blakely, from command Light Cruiser Division 2, to be Commandant, 15th Naval District; and Rear-Admiral Walter S. Crosley, from command, Train Squadron 1, to Naval War College, Newport. Captain Arthur J. Hepburn, formerly Chief of Staff, Battle Fleet, has become Chief of Staff, United States Fleet, and has been succeeded by Captain Arthur St. C. Smith.

U.S. MINE FORCE MEMORIAL.—A war memorial in the shape of an endowed hospital bed has been given to the Northern Infirmary, Inverness, to commemorate American participation in the provision and clearance of the Northern Barrage in the North Sea, and in remembrance of kindness received by members of the U.S. Naval Mine Force from the people of the Highlands during the war.

CRUISE OF THE "RALEIGH." The cruiser "Raleigh," Captain W. K. Riddle, flagship of Vice-Admiral John H. Dayton, Commanding the U.S. Naval Force in Europe, visited Plymouth from the 3rd to 10th June, and Gravesend from the 11th June to 1st July. The "Raleigh" had been visiting Turkish, Italian, Spanish, Portuguese, Belgian and French ports. As she entered the Sound, she dressed ship over-all in honour of the King's Birthday.

LAUNCH OF THE "CHESTER."—The 10,000-ton cruiser "Chester" was launched at Camden, New Jersey, on 3rd July. She is the first of the six cruisers laid down in 1928, and the third of the eight cruisers authorised by the law of December, 1924.

URUGUAY.

The Naval programme for which the money was voted last year is intended to cover the reconditioning of the cruiser "Uruguay," the purchase of two destroyers, three torpedo boats and a small submarine depot ship.

Provision is also made for the naval air service and for improvement to dockyards and arsenals.

ARMY NOTES

REGULAR FORCES

HOME

THE SECRETARY OF STATE FOR WAR.—The Right Hon. Tom Shaw, C.B.E., the former Minister of Labour in the Labour Government of 1924, has been appointed Secretary of State for War. He was born at Colne, Lancashire, in 1871, and has been M.P. for Preston since 1918. He was Secretary of the International Federation of Textile Workers.

BIRTHDAY HONOUR.—Field-Marshal Lord Plumer was in the Birthday Honours' List raised to the dignity of a Viscount.

APPOINTMENTS AND PROMOTIONS.—H.M. The King has approved of the appointment of Major-General N. J. G. Cameron, C.B., C.M.G., as Colonel of The Queen's Own Cameron Highlanders, in succession to Lieutenant-General Sir J. Spencer Ewart, K.C.B., resigned; of Major-General Archibald Rice Cameron, C.B., C.M.G., as Colonel of The Black Watch; of General Lord Horne, G.C.B., K.C.M.G., D.C.L., LL.D., Colonel Commandant, Royal Horse Artillery (Master Gunner, St. James's Park), as Colonel of The Highland Light Infantry (City of Glasgow Regiment.).

Major-General H. B. Fawcus, C.B., C.M.G., D.S.O., M.B., K.H.P., at present Deputy Director-General, Army Medical Services, at the War Office, has been selected for the appointment of Director-General, Army Medical Services, in succession to Lieutenant-General Sir Matthew H. G. Fell, K.C.B., C.M.G., F.R.C.S., K.H.P., who is retiring at his own wish in September next.

Major-General Evan Gibb, C.B., C.M.G., C.B.E., D.S.O., has been selected to be Director of Supplies and Transport, War Office, in succession to Major-General G. F. Davies, C.B., C.M.G., C.B.E. Major-General C. G. Fuller, C.B., C.M.G., D.S.O., has been appointed Major-General in Charge of Administration, Eastern Command, in succession to the late Major-General C. W. Scott, C.B., C.M.G., C.B.E., D.S.O.

Major-General W. H. S. Nickerson, V.C., C.B., C.M.G., M.B., K.H.S., late Royal Army Medical Corps, has been selected for the appointment of Director of Medical Services in India, in succession to Major-General Sir Walter Ogilvie, K.B.E., C.B., C.M.G., K.H.P., Indian Medical Services.

Colonel Edward Currie Alexander, C.B., C.I.E., D.S.O., Indian Army, has been promoted Major-General.

THE COLOURS OF THE WEST AFRICAN REGIMENT.—The Colours of the West African Regiment, disbanded on 16th May, 1927, were handed over to the Prince of Wales, the Colonel-in-Chief, in the garden of St. James's Palace on 23rd May, to be preserved at Windsor Castle. In front of the Palace were drawn up a number of officers, warrant and con-commissioned officers of the late Regiment. The Prince addressed the parade as follows:—

"This ceremony cannot fail to strike a note of sadness in our hearts, and it is with feelings of no ordinary sorrow that I bid farewell to the West African Regiment, of which I have the honour to be Colonel-in-Chief.

" You are called on to-day, for reasons beyond your control, to part with your Colours, the Colours which, since the regiment's formation in 1898, have been guarded as a sacred trust, and which record your achievements in the Sierra Leone Rebellion, the Ashanti War of 1900, and the Great War.

" In His Majesty's name I gratefully thank all ranks for their loyal and devoted services to the Empire, and, as your Colonel-in-Chief, I am proud to take over these Colours, which will be preserved for all time at Windsor as the visible memorial of a distinguished regiment."

NUMBERS FOR OFFICERS.—Approval has been given to the principle of the use of a Personal Number as a means of readily identifying, in any future national emergency, all officers granted commissions after mobilization is ordered, and all officers of the Regular Army Reserve of Officers, Supplementary Reserve of Officers, Territorial Army and Territorial Army Reserve of Officers.

These numbers will be quoted in brackets directly after the names of the officers concerned in the *London Gazette* and in all official correspondence, documents and returns.

The allotment of Personal Numbers to officers below the substantive rank of Colonel already holding commissions in the Regular Army Reserve of Officers, Militia, Supplementary Reserve of Officers, Territorial Army and Territorial Army Reserve of Officers, will begin forthwith and will be communicated in due course to individual officers concerned or to the headquarters of their units or to both. These numbers are not intended for use during normal times and will not be quoted until a national emergency occurs.

It may be recalled that numbers were given to officers towards the end of the Great War. Officers on the Active List still have numbers, and it is now proposed to extend the system to the officers on all lists specified above.

CHANGE IN ORGANIZATION.—The 13th, 14th and 19th (Survey) Companies, Royal Engineers, have been re-organized to form one survey battalion, which will be designated the Survey Battalion, Royal Engineers.

VOCATIONAL TRAINING.—During May, 170 soldiers completed courses of instruction at the Army Vocational Training Centres at Hounslow, Aldershot and Chisleton, and 130 obtained immediate employment on leaving the Colours. Ten qualified for oversea settlement, while the others took up carpentry, plastering, painting, bricklaying, boot repairing, motor mechanism, positions of trust, private service and other occupations.

TERRITORIAL FORCE

CHANGE IN DESIGNATION.—The designation of the 90th (1st London) Field Brigade, R.A., has been altered to 90th (City of London) Field Brigade, R.A.

DOMINION FORCES.

DISPOSITION OF COLOURS, C.E.F.—Colours of units of the Canadian Expeditionary Force (Great War) which have been handed over to the perpetuating Active Militia Units, will be deposited in sacred or public buildings in the respective localities where the C.E.F. Units concerned were raised. But such action may, at the discretion of the District Officer Commanding, be held in abeyance when the ex-members of a C.E.F. Unit which has an organized Association, apply through such Association for the Colours of the C.E.F. Unit to be held by the perpetuating Militia Regiment, and to be carried on parades in which the ex-members of the

C.E.F. Unit take part as a body. This privilege to be subject to the following conditions :—

- (a) That the required escort will be furnished by the perpetuating Militia Regiment upon each occasion on which the colours are carried ;
- (b) That the Colours will, upon their condition not permitting of them to be further carried, be deposited as above.

REGIMENTAL ALLIANCES.—H.M. The King has approved the following Alliances :—

The York Regiment, Non-Permanent Active Militia of Canada, to The East Yorkshire Regiment ; The 33rd Battalion Australian Infantry, Australian Military Forces, to The Duke of Wellington's Regiment (West Riding) ; The Annapolis Regiment, Non-Permanent Active Militia of Canada, to The Prince of Wales's Volunteers (South Lancashire) ; The 11th Infantry (Rand Light Infantry) Active Citizen Force, Union Defence Forces, to The Duke of Cornwall's Light Infantry ; The 51st Battalion Australian Infantry, Australian Military Forces, to The King's Own Yorkshire Light Infantry.

FOREIGN

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BELGIUM.

AVIATION.—The question of organizing the military aviation as a fifth arm is now under discussion. The promotion of officers is to be separate from the rest of the Army. A special commission is considering the adoption of a distinct uniform for the military aviation.

BULGARIA.

THE ARMY.—M. Bouroff made a long speech in the Sobranje on foreign affairs, devoted to non-military questions, together with an eulogy of the League of Nations. M. Bouroff, however, spoke for a short time about the Bulgarian Army and made the usual complaint that the voluntary army imposed by the Treaty of Neuilly is a heavy financial burden on the country, pointing out that under conscription the barracks had been a finishing school for the youth of Bulgaria, inculcating deeply a sense of civic duty. Deprived of this education the youth of Bulgaria had become a fertile soil for Communism. He concluded by saying that Bulgaria does not wish for a large army and that he hoped that a modification of the relevant clauses of the Treaty of Neuilly might before long win a favourable reception in the countries concerned.

FRANCE.

MECHANIZATION OF FOREIGN LEGION CAVALRY.—The re-organization of one or two squadrons in the Foreign Legion Cavalry is to be taken in hand. If required, these may now be put on a mechanized basis, provided that the total number of effectives in each grade is not increased. It is stated that provision has been made for this mechanization so that the security of the Algerian and Moroccan borders may be ensured, and so that the cavalry of the Foreign Legion may be in a position to carry out any special missions called for by the penetration of the Sahara.

THE UTILIZATION OF CIVILIAN PERSONNEL.—The following are extracts from the *rapports* of the Finance Commission dealing with estimates for the military budget for 1929 :—"The substitution of military by civilian personnel is being effected gradually and on a methodical plan throughout all corps and administrative services, up to and including the central administrative authorities. The new civilian personnel are classified under various categories :—

(a) *Military officials and subordinate officials*, recruited from certain classes of military or civilian candidates.

The duties of military officials and subordinate officials will be to deal with work relating to the preparation of mobilization, acting as accountants, or store-keepers ; further, the accountants will assist in the general administrative services of a unit.

They will be entitled to full civilian and political rights, but will be subject, in the exercise of their duties, to the general regulations of military discipline ; furthermore, the provisions of military law are in some regards applicable to them.

For 1929 estimates have been drawn up on the basis of a budgetary strength of 10,500, distributed as follows :—

Ranks.	Home Country.				Algeria-Tunisia.				General Total.			
	Troops of the Home Army (including Algeria).	Colonial troops.	Total.		Troops of the Home Army (including Algeria).	Colonial troops.	Total.		Troops of the Home Army (including Algeria).	Colonial troops.	Total.	
Administrative officers.	422	16	438		60	2	62		482	18	500	
Officials	4,057	154	4,211		568	21	589		4,625	175	4,800	
Subordinate officials	4,384	165	4,549		629	22	651		5,013	187	5,200	
Totals	8,863	335	9,198		1,257	45	1,302		10,120	380	10,500	

(b) *Other substitution of civilian personnel*.—The recruitment of a supplementary number of permanent civilian employees is allowed, which will bring the strength of these employees, who are to be included in the military services of the home country, to 30,000.

This personnel may be classified as follows :—

- Employees in factories ;
- Employees at headquarters, schools, administrative services and recruiting offices ;
- Filing and accountant clerks and assistant clerks ;
- Workmen employed in parks and constructional establishments, schools and hospitals ;
- Temporary assistants at the Central Administration.

(c) *Temporary personnel for mobilization centres*.—Labour employed in mobilization centres shall be exclusively civilian.

Personnel are engaged for a maximum period of three months by a temporary renewable contract. Under these conditions, the recruiting of labour by direct

engagement is not without difficulties; and military administrative authorities are considering the possibility of providing for the maintenance of material in mobilization centres by contract.

(d) *Women cooks in units.*—Women head cooks engaged in units are employees paid by the mess, not salaried officials under the War Department.

(e) *Personnel in regimental workshops, of foremen tailors, shoemakers and saddlers.*—At present military labour at the disposal of foremen is composed of:—

Workmen (on principle, professionals and of the auxiliary services) allotted, on incorporation, to headquarter units.

Two workmen per administrative unit, one fully qualified and one apprentice, mobilizable with their unit and, on principle, fit for general service.

(f) *Personnel for upkeep of barracks, furniture, heating, lighting and wheeled transport for current use in units.*—An experiment has been carried out to determine the conditions under which various maintenance duties might be transferred to civilian contracts, leaving to the fatigue party only those small jobs which must absolutely be carried out by military labour. It has been proved that the fatigue party of a grouped infantry regiment might be reduced to six men; for the whole army, therefore, this scheme would release a total of approximately 3,000 men for training.

(g) Lastly, the question of the substitution of civilian for military labour in Morocco and the Levant, where the reduction in the length of service makes it even more difficult than elsewhere to employ men of the annual contingent in the various duties of clerks and workmen, has been studied. These duties must there still be carried out, either by professional soldiers, allowed for in effectives provided for in the budget, or by civilian personnel for whose maintenance a special estimate is submitted.

THE INDUSTRIALIZATION OF THE ARMY.

The substitution of civilian for military labour is onerous. It requires, moreover, constant vigilance on the part of commanders.

Working of certain services by contract.

(a) *Transport.*—One of the first services suitable for the scheme is transport within garrison areas.

The necessity for units to ensure the transport required for their daily existence, or to assist in carrying it out by the provision of fatigue parties is, in fact, one of the obligations which weighs most heavily upon them to the detriment of training. Everything therefore points to the provision of some scheme to relieve them of their duties by placing contracts for this class of work. The disadvantage of the system is that it is expensive. It has therefore been considered that a reduction in the number of draught animals allotted to units can be made. These are, however, required for training which cannot be neglected, but are not needed daily. Therefore it would be against Treasury interests to effect all garrison transport by contract without utilizing draught horses for the transport work of the units on days when the latter are not employed for training.

(b) *Motor Transport.*—Experience having proved the disadvantages which arise from allotting motor vehicles to small garrisons, where, owing to the distance from the transport company to which they belong, they are often not kept in good running repair, the authorities are testing a system of contract agreements intended to replace allotted vehicles and ensure transport service by local transport contractors.

(c) *Execution of major cleaning or repairs in camps.*—The execution of major work in cleaning or repairs in camps (beating of bedcloths and rugs, disinfection of premises, upkeep of barracks), is to be done either by civilian labour temporarily engaged or by placing contract agreements. The choice of methods will be determined by local conditions.

(d) *Mobilization centres.*—Experiments with a view to providing for the maintenance of material at mobilization centres by contract are to be tried :—

One, to hand over to local contractors the majority of the equipment stocked in the centres, every possible precaution being taken to safeguard the secrets of mobilization.

The other would consist in making use of foremen, who are prepared to do so, to enter into a contract for the maintenance of equipment stored in mobilization depots. The foremen to find their own labour.

(e) *Supply.*—Methods are being investigated for placing contracts for the maintenance of mobilization stores wherever possible.

(f) *Army Medical Service.*—In this service, contract agreements may be of two types ; there could obviously be no question of running certain hospitals entirely by contract, as was formerly done ; this method of administration, essentially unfavourable to patients, has been abandoned for some time. There is, however, one type of contractor specially qualified for the care of patients, to whom it would be advisable, for military administrative authorities to apply in a large number of cases, i.e., the civilian hospitals.

Development of machinery.

The modernization of kitchens should permit of economy in military personnel, with the improvement of the mess in both quality and quantity. This began with the recruiting of civilian women cooks, and should be followed up by the use of machinery of various kinds.

The extension of the telephone system will also permit of a great economy in military orderlies ; an estimate of 300,000 francs is fixed for this purpose.

Simplification in the working of administrative services.

A commission is to examine the question of administrative decentralization in the three following forms :—

- (a) General authorization for expenditure to be granted to regional commanders, to enable them to ensure, by means of a lump sum, granted annually, the whole or part of a service within the area of their command ;
- (b) Delegation of authority to be granted to regional commanders, enabling them to settle questions of minor importance, which do not justify the intervention of a Minister, by delegation.
- (c) Delegation by regional commanders to their Directors of Administrative Services, which might possibly—on principle and allowing for exceptional circumstances—be made compulsory.

Other forms are :—

In artillery factories, experiments with contract work have been carried out successfully in a regional artillery park ; by this means a very great increase in output, in certain workshops, was proved ; if earlier results are confirmed, the system will be generally adopted for work to which it may be considered applicable.

In order to complete the simplification to be effected in the administrative working of the Army Medical Service, by the introduction of the contract system

discussed above, the War Ministry are also considering the advisability of grouping all military hospitals within the same region under one single management.

Important simplifications have been introduced in the administration of units. In mobilization centres, the diversity of methods of upkeep entails a certain complication of documents and does not permit of economic management. It is proposed to establish a maintenance fund to provide for maintenance expenses for mobilization supplies and those relating to auxiliary services: furnishing, heating and lighting.

ITALY.

SITUATION IN LIBYA.—About 1st February, a large rebel band attacked Regima (about 25 miles east of Bengasi), El Abiar (about 20 miles east of Regima) and Tocra (about 40 miles north of Bengasi on the coast), and drove off cattle and sheep. The gendarmerie encountered the rebels in the vicinity of El Abiar. In the ensuing fight the gendarmerie lost about 30 killed and several wounded, and were only saved from further losses by the arrival of a squadron of armoured cars, which inflicted heavy casualties amongst the rebels who took to flight leaving behind their booty and 14 prisoners.

On 17th February, a strong rebel band drove off 600 camels belonging to a tribe near Soluch, and again on 20th February, 600 camels were taken from the vicinity of Tocra. Rebel activity has also been reported from Tobruk (on the coast about midway between the Egyptian frontier and Derna), where the Colonel commanding the Tobruk Garrison and Zone was wounded.

On 13th March, the 7th Libyans and the 13th Eritreans started a sweeping movement from the redoubt of Gerdes El Abid (about 60 miles north-east of Bengasi) in order to clear the area of certain rebels who were reported in the vicinity. Through information received from the Air Service, the column gained contact with the rebels who attacked the 7th Libyans and attempted to surround them. The Libyans counter-attacked with the bayonet and eventually drove off the rebels who left behind 20 killed and 30 wounded. The Italian losses were one captain, one Italian sergeant, and 25 Ascaris killed and 16 wounded.

During the first week in April a band of rebels consisting of some 250 armed men with a caravan of 150 camels started out from the Harugi Mountains (immediately south of Zella) with the intention of raiding the submitted tribes near Agedabia and Aghalia. News of this band came in at the end of March, and the aeroplanes located it far south of Agedabia early in April. Thereupon the 14th and 15th Eritreans supported by armoured cars, moved out from Aghalia and Agedabia and took up a position in the Wadi El Faregh, which runs east and west about 20 miles south of Aghalia. The aeroplanes kept the rebels under observation and on the 6th April the armoured cars attacked, being joined later by the 15th Eritreans, who surrounded the rebels at a point in the Wadi El Faregh approximately south of Agedabia. The rebels were almost exterminated, 170 dead being counted, including their two leaders, and 150 rifles were picked up. The Italian losses were one Italian non-commissioned officer and four Ascaris killed and about 20 Ascaris wounded.

THE TRAINING OF YOUTH IN ITALY (*Bakilla* and *Avanguardisti*).—The greatest attention is being paid in Italy to the training of boys and youths, not only from a physical and military, but also from a mental and political point of view. The object is to inculcate the spirit and precepts of Fascism in order that future generations shall be imbued with the same ideals and political thought.

In the early part of the year 1926 a Royal Decree was published placing the pre-military training of the youth of Italy under the direct care of the *Milizia Volontaria per la Sicurezza Nazionale* (M.V.S.N.) or National Militia. In each province the chief town has a "Provincial Committee"; in each commune there is a "Communal Committee," and in the great cities each quarter has a "Regional Committee." The committees are composed of a president and members, the number of the latter depending on the size and importance of the locality, but all are Fascists. Their duties are to foster the movement and to enrol members. The title given to this organization is *Opera Nazionale Balilla* (O.N.B.). It is financed by an annual government grant of 1,000,000 lire and voluntary contributions.

Enrolment is voluntary and requires the consent of the parents. The advantages obtained by a boy who joins the *Balilla* are, however, considerable, both in his scholastic career and in after life, and for this reason the numbers enrolling are rapidly increasing.

The boys are divided into two classes: those between the ages of 8 and 14 are called *Balilla* (lit. "those who are fostered"), and those from 14 to 18 *Avanguardisti* (the vanguard).

Military formations are adopted on the model of the M.V.S.N., i.e. :—

A *squadra* consisting of 11 boys.

A *Manipolo* consisting of 3 *squadre*.

A *Centuria* consisting of 3 *Manipoli*.

A *Coorte* consisting of 3 *Centurie*.

A *Legione* consisting of 3 *Coorti*.

Instruction.

The education of the *Balilla* and *Avanguardisti* comprises physical training, fencing, athletics, football, riding, rowing, ski-ing, camping, drill, shooting, etc., particular attention being given to obedience, discipline and a strong development of the Fascist spirit. Particular attention is paid also to the health of the boys, medical attention and medicines being supplied free of charge.

The instructors are specially selected for their ability to impart knowledge and before taking up their posts generally do a two-years' course of training and physical culture. At the chief naval ports the *Balilla* units receive instruction of a naval character.

Balilla houses.

In most of the big towns throughout the country *Balilla* "houses" have been built or acquired for the purpose of providing covered halls for physical training, drills, lectures, etc., and in which the committees can hold their meetings and deliberations.

Relations with the Army.

The boys, both *Balilla* and *Avanguardisti*, wear a uniform very similar to that of the National Militia, i.e., black shirt and cap, grey-green knickerbockers and puttees.

On ceremonial occasions, parades, etc., a place is invariably allotted to the detachment of the local *Balilla* and they are under the Ministry of War for their rules and regulations regarding drill, training, etc.

Conclusion.

Apart from the normal Boy Scout principles of healthy development of mind and body for the youth of the country, and a high sense of patriotism, discipline

and duty, this Italian system aims at instilling from the earliest childhood doctrines of Fascism in its most potent form. In three years the numbers enrolled have risen to over one million, and in a few years most of these boys will be serving in one or other of Italy's fighting forces. At the present time it is no longer possible for an adult man to join the Fascist Party, the object being to keep out lukewarm adherents so that now the only way to become a Fascist is to begin from early boyhood and gradually work up through the *Balilla*, *Avanguardisti* and Militia.

Apart from the great increase in the support likely to be given to the Fascist Party, and the consolidation of the hitherto rather volatile Italian people, the *Balilla* and *Avanguardisti* organizations have already resulted in a direct improvement of the value of the Army.

Comparison with similar systems in Great Britain, U.S.A. and Japan.

Great Britain.—The Italian organizations correspond with the Boy Scout and Church Lads Brigade movements, and to a less extent with the Officers Training Corps. They differ from the British organizations in that the Italian organization deals with the training of youths from their earliest years right up to the time of military service, whereas in Great Britain boys may or may not belong to any of the three organizations referred to, but it differs most particularly in the political control. The British Officers Training Corps scheme is designed to train the future leaders of an Army, and has a comparatively restricted application. The Italian scheme aims far more at training the rank and file. As will be seen the officers of the future are not particularly helped in Italy; it is open to question whether it is more important to have a system which ensures the leaders being thoroughly grounded as in our Officers Training Corps, rather than one in which the rank and file join the colours knowing the elements of drill, tactics, and military science generally, as in Italy.

U.S.A.—The systems in the United States for training juveniles resemble in many ways those of Great Britain. They differ from Great Britain in having forty essentially military schools at which military training is compulsory, and where students wear uniform. But apart from these schools, which do not cater for a great many individuals in proportion to the size of the nation, the Officers Training Corps at 184 colleges and universities corresponds in its aims and objects very closely with the Senior and Junior Divisions of the British Officers Training Corps. The United States thus aim very much, as Great Britain does, at the training of the officers of the future.

The U.S.A. also has an extensive Boy Scout movement, some 800,000 strong, which does not link up with the other systems of juvenile military training.

Japan.—The system of training youths in Japan differs both from the British and American systems on the one hand, and from the Italian on the other. It is only of recent origin, the principal schemes having been inaugurated in 1925 and 1926.

In Japan in all primary and secondary schools the syllabus has always included some military training, such as drill and fencing. Since 1925, military training has been intensified in secondary schools (for boys over 14 years of age); but this scheme applies only to some 10 per cent. of the boys of the country. It resembles the attempts of Great Britain and the United States to cater principally for the training of future leaders.

In 1926 a further scheme was evolved by which the 90 per cent. of boys who only attend primary schools, i.e., the future rank and file, should be given military

instruction at training centres in all parts of the country. Both these schemes are compulsory, military training being as much a part of the school curriculum as geography or history. In both schemes those youths who pass their military course satisfactorily can, if conscripted, have their colour service reduced. The Japanese idea, therefore, would appear to be to teach future leaders, and also to train the remainder of the nation as far as possible in the military virtues.

Summary.

Compared with these other nations it is clear that Italy's system of juvenile military education is the only one which is directly controlled by, and worked in the interests of, one particular political party in the State, though it is true that this party and the State have almost become synonymous terms. The Italian system is in theory voluntary, but in practice will prove almost compulsory. The other main feature about the Italian organization is that it aims at training the rank and file rather than the future leaders. The reason for this is probably political rather than military.

MEXICO.

THE REVOLUTION.—General Calles with the main Federal Army has advanced on Sonora from the south and General Almazan from the east. These operations resulted in the defeat of the rebels, and their activity in that State can now be regarded as virtually at an end. It is reported that General Escobar, the rebel leader, is holding himself in readiness to take refuge in the United States.

The only other States which have shown any rebel activity are Jalisco, Guanajuato (a small State between Jalisco and San Luis Potosi) and Zacatecas, where the Catholic Insurgents have been active. During these activities a British subject, an employee of the American J. G. White Engineering Company, was carried off by the rebels and has not yet been released. The Federal General, Cedillo, who has been carrying out operations against the Catholics, has reported successes. In addition, a proclamation has been published broadcast in Jalisco, Guanajuato and Zacatecas to the effect that all rebels laying down their arms within twenty days would be allowed to return to their homes. This was stated to be giving good results, and the surrender of a group of seventy rebels from the State of Jalisco has been reported.

The President of Mexico has issued a conciliatory statement to the effect that the Catholic Church as an institution had nothing to do with the revolt; that his Government will not persecute any religion; and that the Catholic clergy—provided they respect the laws—can resume their functions.

Detailed casualties in the Revolution are not yet to hand, but it is reported that the total casualties of both Federals and Rebels amount to 4,000 killed and 11,000 wounded.

AIR NOTES

ROYAL AIR FORCE

APPOINTMENTS

<i>Rank and Name.</i>	<i>To</i>	<i>Date.</i>	<i>Remarks.</i>
AIR MARSHALS			
Sir Edward Leonard Ellington, K.C.B., C.M.G., C.M.E.	Headquarters, Air Defence of Great Britain.	1.7.29	On promotion to the rank Air Marshal.
Sir William Geoffrey Hanson Salmond, K.C.B., K.C.M.G., D.S.O.	Headquarters, R.A.F., India.	1.7.29	On promotion to the rank Air Marshal.
AIR VICE-MARSHALS			
Robert Hamilton Clark-Hall, C.M.G., D.S.O.	Air Ministry. (Dept. of A.M. S.R. (D. of E.)	1.7.29	On promotion to the rank Air Vice-Marshal.
Amyas Eden Borton, C.B., C.M.G., D.S.O., A.F.C.	Half-pay List.	1.7.29	On promotion to the rank of Air Vice-Marshal.
AIR COMMODORES			
Peregrine Forbes Morant Fellowes, D.S.O.	Air Ministry. (Dept. of A.M.P.) (D.P.S.)	1.7.29	On promotion to the rank of Air Commodore.
Philip Bennet Joubert de la Ferte, C.M.G., D.S.O.	Special duty List.	1.7.29	On promotion to the rank of Air Commodore.
Reginald Percy Mills, M.C., A.F.C.	Headquarters, R.A.F., India.	1.7.29	On promotion to the rank of Air Commodore.
Wilfred Rhodes Freeman, D.S.O., M.C.	R.A.F. Training Base, Leuchars.	1.7.29	On promotion to the rank of Air Commodore.
William Gore Sutherland Mitchell, C.B.E., D.S.O., M.C., A.F.C.	Headquarters, Aden Command	1.7.29	On promotion to the rank of Air Commodore.
Norman Duckworth	Headquarters, No. 22 Group.	12.4.29	On appointment as Air Officer Commanding, <i>vice</i> Air Commodore D. Le G. Pitcher, C.M.G., C.B.E., D.S.O., on retirement.
Kerr MacEwen, C.M.G., D.S.O.			

FLYING TRAINING.—During the period 1st April-30th May, 1929, the following have completed Courses of Instruction at Flying Training Units:—

	<i>Officers.</i>	<i>Airmen.</i>
" Ab initio "	82	15
" " R.N.	4	—
Conversion Course	2	—
Refresher Course	6	—

ARMY CO-OPERATION (HOME).

Squadrons are allotted to Commands as follows :—

No. 2 (Army Co-operation) Squadron to Eastern Command.

Nos. 4 and 13 (Army Co-operation) Squadrons to Aldershot Command.

No. 16 (Army Co-operation) Squadron to Southern Command.

No. 26 (Army Co-operation) Squadron to Northern and Scottish Commands.

Army Co-operation Squadrons attended their annual practice camps in April, at which they carried out their air firing and bombing practices.

During April and May the Junior Division of the Staff College was attached in parties to four of the Army Co-operation Squadrons for a period of twelve days.

In May the Artillery Practice Camps commenced and the Squadrons have been co-operating with the Artillery Formations of the Commands to which they are allotted.

The Anti-Aircraft Practice Camp opened at Watchett in June. The Night Flying Flight moved from Biggin Hill to Weston Zoyland to tow the targets, etc., and will remain there until the camp closes in September.

Brigade training has now commenced and all squadrons are engaged in providing the necessary co-operation.

The 22nd R.A.F. Officers' Course has passed out of the School of Army Co-operation.

UNIVERSITY AIR SQUADRONS.

These two Squadrons, which were formed at Oxford and Cambridge three years ago, are now in Camp at Manston and Old Sarum respectively. They are both up to strength of 75 members each, with a considerable waiting list.

The annual camp lasts six weeks, the members attending in three batches of twenty-five for the space of fourteen days.

The weather has been good and the majority of members are now capable of flying solo.

These Squadrons are providing many officers for the Reserve of Air Force Officers.

OVERSEAS COMMANDS

ADEN

For some time past considerable attention has been paid to the development of new landing grounds in the Protectorate and the progress made both inland and along the coast has been very satisfactory. Reconnaissances have been made as far East from Aden as is consistent with safety and now a chain of landing grounds exists from Perim to Shihr (350 miles East of Aden). Intermediate landing grounds between Aden and Shihr have recently been constructed at Majdaha and Shuher (15 miles East of Mukalla, the principal port of the Hadramaut). The question of extending this chain of landing grounds further East is being investigated and it is hoped that before long additional landing grounds will be established—one in Dhufar—about 400 miles East of Mukalla and one at Kishn, midway between Mukalla and Dhufar.

IRAQ

During the period under review the situation generally has remained quiet and no offensive operations have been necessary.

No. 203 (Flying Boat) Squadron, which is a self-contained mobile unit of the Iraq Command, arrived at Basrah, its permanent station, on 14th March, where exhaustive tests are being carried out in order to ascertain the capacity of flying boats under the operational and climatic conditions prevailing in that area. Besides being available to assist the A.O.C. in reconnaissances and offensive action in conjunction with other air units and with the Royal Navy, the squadron is undertaking cruises for the purpose of establishing landing grounds and refuelling bases on the Arabian side of the Persian Gulf with a view to the development of an alternative air route from Iraq to India. On a number of flights which have already been undertaken the local Sheikhs have been carried as passengers.

On 8th May, two flying boats left Basrah on an extended cruise and proceeding by way of Bahrein and Henjam reached Muscat on 10th May, where they were joined by Colonel Barrett, the Acting Political Resident in the Persian Gulf. At his request, on account of political difficulties at Sur, one of the flying boats proceeded as far as Ras al Hadd, the most easterly point in Arabia, demonstrating over Sur en route. The flight left Muscat on 12th May, and after visiting Henjam, Dibah, Ras al Khaimah, Sharjah, Bahrein and Koweit, arrived at Bushire on the 16th May, where Colonel Barrett was put ashore and the flight continued to Basrah.

A further cruise along the Trucial coast was undertaken during June. On 17th June one flying boat left Basrah and taking on board the Political Agent at Bahrein flew to Abu Dhabi, where possible sites for a seaplane base and aerodrome were investigated. From Abu Dhabi the flight proceeded along the coast and reached Ras al Khaimah on 19th June. Here the night was spent and after refuelling, the flight returned to Bahrein, visiting Umm al Kaiwain and the island of Bu Musa en route. At both Abu Dhabi and Ras al Khaimah the local Sheikhs were very friendly and the flight was well received by the local inhabitants. On 21st June a visit was made to Yas Island, where excellent flying boat shelter was found in the lagoon. The flying boat returned to Basrah the following day. During the cruise the full effects of the Shamal—a strong North Westerly wind which brings clouds of dust from Iraq and Arabia—were encountered. Visibility was consequently very poor and at times considerable difficulty was experienced in distinguishing the outline of the coast. In spite of this, however, the flight carried out its programme without any untoward incident.

It is hoped to undertake a flight to Karachi in the near future.

PALESTINE AND TRANSJORDAN

As a result of a raid carried out during March on the Beni Sukhr tribe by the Sharafat and Uzelmat sections of the Arab el Jebel (Syrian) tribe, operations were undertaken against the latter by a force consisting of aircraft of No. 14 (Bomber) Squadron, one section of No. 2 Armoured Car Company and three troops of the Transjordan Frontier Force.

The column left Amman on 13th March, and on reaching a point three miles East of the railway near Mafrak, made contact with the raiders, who were retreating towards Umm el Jemal. The raiders, on observing the column, opened fire and after a short action in which the aircraft took part, the raiders were driven back,

Owing to the rocky nature of the ground and the proximity of the frontier, the armoured cars were unable to intercept the raiders, who escaped into Syrian territory. Later in the day another party of the raiders was reported South of the column. This party, on being engaged by the column, split up into small groups and under cover of broken ground retreated towards Syrian territory. The armoured cars were again unable to advance owing to the bad ground and the aircraft were accordingly brought into action against these small parties. The aircraft had orders to take action only in Transjordan territory, and as the main party of the raiders had by this time crossed the frontier, further action was suspended.

During the operation the enemy lost approximately 25 killed and about 350 head of looted stock were recovered. The operational flying time by the aircraft amounted to 17½ hours.

During May a demonstration in support of the Civil Authorities was carried out by No. 2 Armoured Car Company. News was received of Howeitat and Beni Sukhr (Transjordan tribes) concentrating in the neighbourhood of Bair, with the intention of raiding into Nejd. An attempt was made by the civil authorities to persuade the tribesmen to disperse, but as the outcome was doubtful, the assistance of the Royal Air Force was enlisted and two sections of No. 2 Armoured Car Company accompanied the representative of the Civil Authorities to Bair. By the time they arrived the tribesmen had returned to their camps. Those with the guilty Sheikhs were then either surrounded or, where this was not possible, effectively covered by the armoured cars and the Sheikhs arrested and handed over to the Central Jail at Amman. The object of the operations was achieved through the moral effect of the presence of the cars and no offensive action was taken. During the operation touch was maintained by reconnaissance aircraft between the armoured cars and Amman.

SINGAPORE

In order to gain experience of flying conditions during the Monsoon period between Calcutta and Singapore, arrangements have been made to carry out service flights by No. 205 Flying Boat Squadron along this route. The first flight from Singapore to Rangoon and back by one flying boat commenced on 10th June and Rangoon was reached on 18th June. The flight called at Penang, Victoria Point, Mergui and Tavoy on the outward journey, and visited Tavoy, Mergui, Victoria Point, Penang and Port Swettenham on the return. The flight arrived back at Singapore on 27th June. It is proposed to carry out further flights from Singapore to Calcutta and back to extend over the latter half of the Monsoon period. Moorings have been prepared and fuel laid at the above mentioned places and also at Akyab, Chittagong and Calcutta, in readiness for the flights covering the whole route.

SUDAN

Owing to the considerable difficulties encountered in the operation of landplanes in the swamp areas of the Bahr-el-Ghazal Province, the feasibility of using aircraft fitted with float undercarriages in order to open up this region to aircraft has recently been explored. Test flights in the low-lying country between Malakal, Wau, Mongalla and Nasser were made, but difficulty was experienced in operating the aircraft owing to the shallowness of the water and obstructions caused by submerged bushes and trees. Difficulty was also experienced in taking off owing

to the lack of sufficient open water. As, however, the tests were carried out in the dry season, the results cannot be regarded as conclusive, and it is proposed to carry out further trials after the rains in order to determine whether float undercarriages are suitable for use in the swamp areas of the Sudan.

DOMINION AIR SERVICES

CANADA

AIR SURVEYING IN BRITISH COLUMBIA.—Ten thousand square miles of territory along the line of the Pacific and Great Eastern Railway in Northern British Columbia, North of Prince George and South West of the Peace River Country, are to be surveyed this summer from the air.

The utilization of aerial methods of survey will make possible the completion of a map in one summer, which under ordinary procedure would require several seasons to finish.

Two Royal Canadian Air Force cabin monoplanes will be loaned by the Canadian Government. At least one, and perhaps two, commercial planes operating in Vancouver will assist the R.C.A.F. machines.

A total of \$400,000 is to be spent making the survey of the natural resources of the 10,000 square miles.

DESTRUCTION OF THE SPRUCE BUD WORM.—Aircraft are being used extensively to rid large areas of the pest of the spruce bud worm. Each machine carries 1,600 pounds of powder and, flying low, dusts the infected crops with excellent results.

Float-planes are used in order to take advantage of the numerous small lakes in districts where there are no suitable landing grounds.

An official report states that some 600,000,000 acres in Canada are now protected from fire and disease by air patrol.

AVIATION IN FOREIGN COUNTRIES

FRANCE

ESTIMATES.—The Air Estimates for the financial year 1930 which are to be presented to the Chamber of Deputies in October next amount to 2,045,607,921 francs. This is an increase of 224,400,651 francs over the sum actually voted for 1929.

VINCENNES FLYING MEETING.—The Air Meeting at Vincennes was held on the 19th and 20th May last. Some three hundred thousand people watched a demonstration of formation flying, air fighting and a bombing scene including the destruction of a miniature village.

The La Cierve autogyro gave a demonstration flight.

Four aircraft simultaneously dropped parachutes with dummies attached.

ATLANTIC CROSSING FROM WEST TO EAST.—On Thursday, 13th June, Monsieur Armand Lotti, Sergeant Jean Assollant and Rene Lefeore left New York on a single engine Bernard monoplane and reached Comillas, Spain, on Friday,

14th June, 1929. The original intention was to reach Paris non-stop, but owing to a suspected shortage of petrol, due to the weight of a stowaway found on board, this was thought to be impossible.

ENDURANCE FLIGHT.—An attempt to break the world's endurance record has just been made in France in a special Potez aeroplane with 600 h.p. Hispano engine piloted by De Marmier and Favreau.

The flight took place on two closed circuits: by day, Le Bourget and Griz Nez, and by night, Le Bourget and Vauciennes.

The flight was broken off owing to carburation trouble after the aircraft had covered a distance of 6,525 kilometres and had been in the air for 41 hours 3 minutes. The aeroplane left the ground with 4,600 litres of petrol, and at the end of the flight it is stated that there was sufficient fuel left over for about 10 hours more flying.

GERMANY

WORLD'S ALTITUDE RECORD ESTABLISHED BY JUNKERS W.34.L.—Flying a standard Junkers W.34.L aircraft equipped with a Bristol Jupiter Mark VII engine, the Junkers pilot, Neuenhofen, on 26th May, attained a height of 12,739 metres (41,794 feet), which has since been recognised as a world's record.

Full details of the performance were published in "The Aeroplane" of 12th June, 1929.

ITALY

AIR CRUISE TO THE BLACK SEA.—A formation of 35 Italian flying boats, 32 of which were of the type "Savoia 55," two of the type "Savoia 59," and one a "Cant 22" left Taranto on 5th June for a cruise to the Black Sea and back. Colonel Pelligrini was in charge of the Flight which also carried Signor Balbo, the Under Secretary of State for Air, General Pinedo, the Chief of Air Staff, and various Press and foreign representatives.

The Flight arrived at Athens on 5th June, but no special arrangements were made for their reception as it was decided to receive them officially on the return journey.

On 6th June the Flight landed at Constantinople, where messages of greeting and friendship were exchanged between Signor Balbo and Mustapha Kemal.

From there the Flight proceeded to Varna on the coast of Bulgaria, where it landed on 7th June. Owing to the existence of the Straits Convention by which no force greater than that of any other Power in the Black Sea may pass through the Straits, the Italians split up their formation into two units of 21 and 14 aircraft, respectively. The unit of 21 (which is the declared size of the Russian Air Service in the Black Sea) flew up the Straits, whilst the other 14 machines flew over the land and joined them later on. This method of evading the purpose of the Convention, however, was not approved of by the Committee responsible for its application, and a protest was later submitted to the League of Nations.

At Varna, Signor Balbo made certain remarks of a semi-political nature which were rather resented by the French element in Bulgaria and Roumania, but which were fortunately not given a great deal of publicity in the Press.

From thence the Flight went on to Odessa, where it landed on 8th June. The Italians were very well received by the Russians, who gave them an official

reception and with whom they exchanged cordial sentiments. The Flight left Odessa on 10th June and landed at the Roumanian port of Constanza on the same day. Here Signor Balbo was rather heckled by the Pressmen on his remarks at Varna but passed the matter off by saying that he had been mis-reported.

Leaving Constanza on 14th June, the Flight arrived at Constantinople in three hours. It left Constantinople on the 16th, arriving at Athens after a flight of about 4½ hours. The Italians were most cordially received at Athens, where the senior officers of the Flight were presented with Greek decorations and M. Venezelos made statements to the Italian Press representatives on the good feeling existing between the two countries.

On 18th June the airmen arrived back at Taranto, and the following day the whole formation flew over Rome and landed at Orbetello, where they were inspected by Signor Mussolini. After the inspection, Signor Mussolini addressed the officers and men of the Flight in his most popular vein ending up with the question "To whom do the skies of Italy and Europe belong?" which was answered by the shout of "To us"! On the following day the Flight was inspected by the King.

The whole flight was carried out without a hitch of any sort, there were no forced landings and no engine failures, which speaks well for both the Staff work concerned and for the Isotta Fraschini "Asso 500" engines which were used on all the machines.

SOVIET UNION.

AIR FORCE EFFICIENCY.—In an article in the Russian aeronautical press, Baranov, the chief of the Soviet Air Force, points out weaknesses which became apparent during last year's summer training and manoeuvres. He hints, in the first place, that staff work was regarded as the efficient running of an office rather than a means of assisting the commander in operations. Aircraft supply and repair parks were not sufficiently mobile and more attention is to be given this year to the mobility of both parks and squadrons. An increase in the number of engine failures was due partly to the increased amount of flying, but also to defects in Air Force technical organization. The number of flying accidents also increased, owing to the breach of flying regulations in a number of units and to defective unit organization. Although appreciable progress was made last year in flying by night and in poor weather conditions by day, great improvement in these respects is still required. Improvement in air gunnery and bombing is also needed, the air gunnery of fighting units being particularly in need of attention.

SPECIAL FLIGHTS.—A programme of long distance flights for 1929 has been drawn up and has been sanctioned by the Soviet Air authorities. Both civil and military aircraft will take part, the longest flights being the following :—

- (a) *For Commanders of Air Brigades.*—Moscow, Leningrad, Vitebsk, Gomel, Kiev, Kharkov, Briansk, Moscow, Nijni-Novgorod, Vyatka, Kazan, Sizran, Stalingrad, Voronej, Moscow. (4,000 miles).
- (b) *For Squadron Commanders.*—Leningrad, Vologda, Vyatka, Kotlas, Archangel, Plesetsk, Vologda, Moscow, Vitebsk, Novgorod, Leningrad. (2,600 miles).

- (c) Two races (in which, presumably, civil aircraft will compete) will be held, one following the air route from Moscow to Baku, and the other following a circular route of 4,800 miles—from Moscow to Baku and Tashkent, returning via Orenburg to Moscow.

There will also be a series of district competitions.

In August, 1929, an attempt is to be made by Shestakov, a well-known Russian long distance pilot, to fly from Moscow to New York, via Siberia, the Aleutian Islands, Seattle and San Francisco—a total distance of 12,500 miles. It is intended to attempt this flight with a new Russian-designed three-engined aeroplane, the "A.N.T.9," floats being substituted for wheels between Khabarovsk and San Francisco.

UNITED STATES.

UNITED STATES AIR APPROPRIATIONS, 1929-30.—The "direct" appropriations for the Air Services and Civil Aviation, fiscal year ending 30th June, 1930, compared with those for the year ended 30th June, 1929, show the following increases or decreases :—

	1929-30.	1928-29 (Including supplementary).	+ Increase. — Decrease.
	£	£	£
Army Air Corps	6,982,012	5,726,996	+ 1,255,016
Naval Air Service	6,343,084	6,456,606	— 113,522
Civil Aviation	5,213,415	4,209,834	+ 1,003,581
Total "Direct"	£18,538,511	£16,393,436	+ £2,145,075

To the above Air Corps and Naval Air Service totals there must be added the cost from "indirect" sources, i.e., pay, rations, clothing, quarters, medical, etc., which will not be known until after the close of the fiscal year. An estimate of the cost in this direction is given as follows :—

"Indirect" estimated for.	1929-30.	1928-29.	+ Increase. — Decrease.
	£	£	£
Army Air Corps	6,533,860	5,000,000	+ 1,533,860
Naval Air Service	3,600,000	3,479,102	+ 120,898
Total	£10,133,860	£8,479,102	+ £1,654,758

The total cost of aviation in the United States may therefore amount to :—

	1929-30.	1928-29.	+ Increase. — Decrease.
	£	£	£
"Direct" appropriations	18,538,511	16,393,436	+ 2,145,075
"Indirect"	10,133,860	8,479,102	+ 1,654,758
Total	£28,672,371	£24,872,538	+ £3,799,833

NEW AIRCRAFT.—The amount allotted for the purchase of new aircraft and aircraft equipment (included in the "direct" appropriations) is approximately as follows:—

	1929-30.	1928-29 (Includes supplementary appropriations).	+ Increase. — Decrease.
	£	£	£
Army Air Corps	3,448,407	2,854,164	+ 594,243
Naval Air Service	3,019,586	3,525,911	— 506,325
Total	£6,467,993	£6,380,075	+ £87,918

AIRCRAFT CONSTRUCTION.—The following table showing aircraft production for the calendar years 1925 to 1928 is of interest:—

	1925.	1926.	1927.	1928.	
Airframes	711	1,179	1,888	4,217	} Includes commercial and Military.
Floatplanes and Amphibians	78	7	107	129	
Total	789	1,186	1,995	4,346	

Under construction at the end of the year:—

1925	259
1926	508
1927 and 1928	Not available.

The total approximate value per year of aircraft and engines produced during the same period has been estimated to amount to:—

	1925.	1926.	1927.	1928.
Total Value	£2,555,036	£3,538,901	£4,232,370	£12,932,498

Note.—(a) In addition to the 4,346 aircraft produced during 1928, 164 aircraft were reconditioned by the industry for commercial use.

(b) Aircraft engines produced during 1928 totalled 3,496 new and 700 reconditioned, valued at approximately £4,068,500.

CIVIL AVIATION.

REFUELLING FLIGHTS.—Since the Army Air Corps set up a record refuelling flight of 150 hours 46 minutes last January (referred to in the February JOURNAL), other records have been established and broken by civilian pilots in civilian aircraft. Pilots L. W. Mendell and R. B. Reinhart now hold the record with a total of 246 hours 45 minutes flight in a Buhl (cabin type) biplane, carried out from California on 12th July last.

COAST TO COAST RECORDS.—Captain Frank M. Hawks, in a Lockheed "Air Express" monoplane (a commercial cabin type), flew from New York to Los Angeles, non-stop, in 19 hours, 10 minutes and 32 seconds. Adjustments to the engine and slight repairs to the machine caused a stay of 7½ hours at Los Angeles, after which Captain Hawks left for New York, making the return trip, also non-stop, in 17 hours, 38 minutes and 16 seconds. Total flying time, New York-Los Angeles-New York, a distance of approximately 5,400 miles, was 36 hours, 48 minutes, 48 seconds. This represents an average speed over the whole distance of nearly 140 m.p.h. The flight was accomplished on 27th-29th June, 1929.

AIRSHIP NOTES

GREAT BRITAIN.

NEW AIRSHIPS.

R.100."—The process of inflation was due to begin about the end of July or beginning of August.

"R.101."—The inflation of this airship has begun at the Royal Airship Works, Cardington.

After inflation both airships have to undergo shed trials as a preliminary to flight trials, which will, it is hoped, begin about the end of September.

AIRSHIP STATIONS.

ENGLAND.—Cardington: No. 1 Shed, No. 2 Shed, and Mooring Tower, complete and ready for operations.

EGYPT.—Ismailia: Mooring Tower complete and ready for operations.

INDIA.—Karachi: Shed complete but structural modifications are proceeding. Mooring Tower will be completed by the end of August, 1929.

CANADA.—St. Hubert: Mooring Tower complete except for minor details.

GERMANY.

Following the successful flight of the "Graf Zeppelin" to Palestine and back, 24th-28th March, a second Mediterranean cruise of 57 hours was accomplished, 23rd-25th April.

On 17th May the airship left Friedrichshafen with 18 passengers and a crew of 40 on its second Atlantic flight. Engine trouble, however, developed later on in the day soon after passing over Saragossa, Spain, and it was decided to abandon the flight. Eventually the airship was safely housed in the shed at Cuers-Pierrefeu, near Toulon, after many hours battling with a high wind in an unsuccessful attempt to return to its base. The return to Friedrichshafen was accomplished on the 23rd-24th May.

The "Graf Zeppelin" is scheduled to undertake a round-the-world flight in August.

SPECIAL EXHIBITION OF LIGHTER-THAN-AIR MODELS IN THE R.U.S. MUSEUM.

A Special Exhibition of models illustrating the development of lighter-than-air craft is in process of formation in the Crypt of the R.U.S. Museum.

A fine $\frac{1}{4}$ inch to 1 foot model of "R.101" is already on view. During the autumn it is hoped to add to the collection, which is on loan from the Air Ministry, until the end of next Christmas holidays.

REVIEWS OF BOOKS

NAVAL.

Reminiscences. By Admiral Sir Reginald Tupper, G.B.E., K.C.B., C.V.O. (Jarrolds, London). 18s.

The early chapters of Admiral Tupper's account of his own career in the Navy remind one of the works of W. G. H. Kingston and Ballantyne, whose books must have induced many a boy to go to sea. His description of an old-time gunroom, "a small compartment on the lower deck, with practically no light or air at sea" initiates the reader at once into the atmosphere of the Navy as it was over fifty years ago; rough and ready, but full of adventure and free from the trammels of wireless, a Navy the passing of which many still regret and compare by no means unfavourably with that of to-day, with its big fleets, its somewhat mechanical efficiency, and, too often, its lack of scope for traditional daring and initiative.

As a Midshipman, the author did his first commission in Eastern waters and his next on the far side of the Atlantic, so that he had an early opportunity of "seeing the world." All through these chronicles we notice his keen insight in regard to personalities and events, and a cheery optimism which carried him on in spite of the occasional set-backs to advancement which are bound to come the way of an officer who is not content to "let the wind blow him along."

Sub-Lieutenant Tupper joined H.M.S. "Alexandra," flagship of the Mediterranean Fleet, on emerging from his qualifying courses, but ere long was selected to act as First Lieutenant of the little "Renard," a schooner of 120 tons, this being the result of his own application before leaving England, to be given any appointment which gave promise of promotion. The "Renard" took part in a punitive expedition in the Solomons, which gave him a chance to distinguish himself. His reward came in the shape of an appointment to the Royal Yacht. In informing him of his good fortune, the Commodore remarked that an essay which had received honourable mention in the R.U.S.I. JOURNAL might also have been counted to his credit.

As a Lieutenant, the author early specialised in gunnery. Never given to self-advertisement, Admiral Tupper's name is less well-known to the general public than that of one of his predecessors as a subsequent Captain of H.M.S. "Excellent," the blue-ribbon of the gunnery expert; but the debt which the Service owes him for the part he played in raising the efficiency of the most important arm of the fleet from the very low ebb at which he found it at the outset of his career as a gunnery officer, is well known to his contemporaries and to those who profited under his training.

The salvage of a large sailing ship from a beach in Japan; "torpedoing" the flagship from his destroyer during manœuvres when the weather was so bad that he was not expected to be at sea; experiments with carrier pigeons and Cody's kites; gun trials in electrically operated turrets which threatened to ignite the

charges and blow up the occupants at any moment; these and similar episodes only serve as examples of a very active life. But it was left to the war to make the highest claims on Admiral Tupper's abilities, courage and steadfast devotion to duty. He describes, modestly enough, the work of the Tenth Cruiser Squadron, the force which kept the Northern gateway into the narrow seas, as the Dover Patrol kept the much easier pass to the South. How well that service was performed, how great the difficulties, how high the spirit inspired by fine leadership, the reader must judge for himself; but he cannot fail to be struck by the fact the Tenth Cruiser Squadron must rank very high amongst the British naval commands which throttled the enemy, and so brought about the end of the war. To those who to-day are talking glibly of "the freedom of the seas," these chapters are specially commended.

For an officer whose whole heart is in his profession, the final parting must always be a wrench, but as Admiral Tupper reminded us in his recent lecture,¹ and as he implies in the *L'Envoi* of his book, there is always work to be done for those with the will to do it. In his case he carries on one of the labours which did so much to ensure his culminating success afloat. Few naval officers understand the personnel of the Mercantile Marine as well as he does, none has done more to bring that Service and the Royal Navy together in war. His untiring efforts to hold them together in peace is a self-appointed task of truly Imperial value.

Diary and Letters of Admiral Sir C. H. Fremantle, G.C.B.

Lord Cottesloe has performed a useful service in editing and printing for private circulation a collection of letters and diaries of his great-uncle Admiral Sir C. H. Fremantle, the more so as the appearance of the book marks the centenary of the foundation of the Colony of Western Australia in which the Admiral, then Captain of H.M.S. "Challenger," played so prominent a part. Following a short biographical sketch come the letters conveying the orders to Captain Fremantle to take possession of "the Western Coast of New Holland," in the name of King George IV. The diary which follows, dating from April to September, 1829, gives a very interesting account of the first meetings with the natives, of bad weather and of the difficulties and dangers encountered by those who founded the Australian Colonies. The "Challenger" left for the East Indies Station after seeing the Colony started and returned three years later to find it well established but suffering from many difficulties. The short diary which closes this interesting little book gives a good insight into the character of the pioneers of Australian Settlement.

On the High Seas. By E. Keble Chatterton. (Philip Allen & Co., Ltd.). 10s. 6d.

A book by E. Keble Chatterton, dealing with maritime matters, is always welcome, and his latest work, "On the High Seas," is as full of interest as its many predecessors. It is a book of yarns "concerning ships, men and the sea" in the days of the old wooden sailing ships, from the dawn of the seventeenth century onwards. There is a vivid description of the conditions of life at sea in the old days, followed by tales of the "profession of piracy," of the adventures of the ships who made the searches for the North West Passage and of the fight for the suppression of the Slave Trade. There are stories of exploration, of mutiny and of hurricanes and the author closes his book by coming down to modern times to

¹ "The Part of the Retired Officer in the Future of the Empire."—R.U.S.I. JOURNAL, February, 1929.

show that there is still high adventure to be found upon the sea, both in peace and war. In the last chapter there are several stories of the Great War, in which the author himself took part, and which are little known. Perhaps his reading of the strategy of incidents will not be accepted by everyone, but this does not detract from the merits of a book that is essentially a collection of yarns, and good ones at that. It is a book that will satisfy any reader who feels, as the author writes in his preface, "that no fascination can compare with maritime adventure, even when experienced in the comfort of an armchair."

MILITARY.

The German Official History of the War. "Der Weltkrieg 1914-18. Band VI. Der Herbstfeldzug 1914. Der Abschluss der Operationen im Westen und Osten." (Berlin: Mittler & Sohn). 26 marks.

The sixth volume of the German Official History of the War, prepared in the Reichsarchiv, deals with the closing operations of the year 1914, from the 4th November to the end of December, both in the West and in the East. It therefore includes the last German attacks against Ypres and the repulse of the feeble December offensive of the Allies, and, in the East, Hindenburg's flank attack from the north (battles of Wlozlawek and Kutno) which brought the Russian advance to a standstill; the vain efforts of the Germans to surround their opponents in the battle of Lodz; their short advance, after the arrival of reinforcements from the West; the minor fighting in East Prussia; and the Austrian operations near Krakau, in which a German division was engaged, which culminated in the battle of Limanova.

The interest of the volume, however, is not in the description of the fighting, which is necessarily short, and gives more space to successes than defeats—the decisive day, the 11th November, at Ypres, gets exactly eight and half lines, whilst the "break-through at Breziny," on the 24th November, has five pages. Its value lies in the account of the difficulties of the Supreme Command in balancing the demands of West and East, and of what the compilers call "General von Falkenhayn's wavering." Easy successes could be attained in the East, and the Hindenburg party clamoured for reinforcements to make them decisive. As early as the 22nd October, at least, Falkenhayn had in his mind a very far-reaching plan to settle with Russia. He contemplated abandoning East Prussia temporarily to his opponents if they chose to advance into it, and concentrating the Eighth and Ninth Armies, every available man drawn from the fortresses and garrisons, also eight divisions brought from France, against the northern flank of the Russian advance through Poland. It was Hindenburg's operation carried out with six times the force he could spare. The stout Allied resistance in France and Flanders upset this plan. Falkenhayn could not make up his mind to withdraw the eight divisions he required for the East without some at least apparent success in the West.

On the 4th November, a report was received from Hindenburg that he meant to make a flank attack with three corps, at a date not yet fixed, as the only means of stopping the enemy advance. On the same day, General von Falkenhayn made the fateful decision to continue the offensive in Flanders, in spite of the critical situation in the East. He hoped by capturing Ypres to gain the definite visible success in the West which he wanted. The East meantime had to get on as best it could.

Time was short; ammunition was failing. Falkenhayn could only put his hand on two additional divisions, the 4th and the 9th Reserve, but Crown Prince Rupprecht managed to comb out, in addition, a composite Guard Division. The great offensives of the 10th-11th November failed; but renewed attacks were ordered by Falkenhayn and continued with tired and disheartened troops until the 18th. The losses before Ypres, 10th-18th November, "which can only be given approximately," are put at "19,500 dead and wounded, and 4,000 missing, total 23,500." More significant, however, than these "approximate" figures is the report of the commander of the German Fourth Army on the 15th November. "Losses and increasing sickness [a footnote states 'bowel complaints and typhus'] have so diminished the number of effectives in the army, that a further advance can only be made after the arrival of fresh troops. On the average, the divisions can only muster 2,000 rifles." The first battle of Ypres was in fact one of the great turning points of the war. The German autumn offensive had completely failed, and the Allies had foiled the enemy's great strategic plan. "General von Falkenhayn no longer expected a decision in Flanders." Nor could he hope for one on his Eastern front. He stopped operations in the West; but instead of being able to send eight divisions to Hindenburg—and it must be recalled that six fresh German divisions sent from the general reserve upset the equilibrium in 1917, defeated the Kerenski offensive, brought off the passage of the Dvina and the capture of Riga, and finally obtained the victory of Caporetto—instead of this compact and decisive force, Falkenhayn could only dispatch eight tired and exhausted divisions, one after the other, as he could pull them out, and their arrival only helped to achieve the gain of a little ground by frontal attack. The Russian line still held.

The book sums up strongly against Falkenhayn, and what it calls his "decisionless leading." It shows his slowness or unwillingness to realize the coming of trench warfare and the possibilities of the defence. In fact, it says that until the abortive Allied December offensive on Arras and northwards to Messines took place, he was by no means sure that he could withdraw important forces to Russia without leaving the Western front too weakly held.

There are 21 maps and sketches contained in a folder in the volume, orders of battle, a long table giving movements of divisions and a good index.

Further Aspects of Mechanization. By Brigadier General H. Rowan-Robinson, C.M.G., D.S.O., *p.s.c.* (William Clowes & Sons, Ltd., London, S.W.1) 1929. 6s.

Brigadier General Rowan-Robinson evidently desired to give his readers food for thought when he wrote this book; perhaps it was with that end in view that he pitches much of it in a note which is hyper-critical if not definitely provocative.

He opens, in the preface, with an American account of a new American tank, appropriately called the "wild cat"; this as a feat of journalism may arrest the attention, but, as an example of progress in mechanization on the other side of the Atlantic, it can hardly be taken seriously.

Elsewhere, too, he appears to be trying to stimulate the imagination by painting pictures which are, to say the least, futurist. An example of this is his advocacy of "command from the air," the practicability of which appears to be effectively condemned in his own words. How, we ask, is command to be exercised efficiently from "a confined, noisy and wind-swept seat . . . the target of enemy aircraft,

which have been warned to fight, neither with small nor great, but only with the King of Israel."

Again, we must join issue with the author when he states "we are modernizing our Army mainly to enable the country to fulfil, if need be, certain pledges on the Continent of Europe." The British Army to-day must be organized to meet the most probable of a number of potential situations overseas; but a European conflict certainly does not hold pride of place.

For the rest he seems inclined to blame the authorities for not having enunciated a clear policy and a decided course of action; but is it in the highest interests of the State to make known to the world our difficulties and our ambitions—we doubt it.

The later chapters contain much apposite criticism of detail and the writer is on firmer ground when he emphasizes the need for something more than good co-operation between mechanization on the ground and in the air. There is much weight in his contention that the personnel of a force which is to work in such close communion as one composed of tanks and aircraft must not only be "brigaded together, work together and live together," but that it should belong to one Service. In fact, as he says, we should "cease to regard the aeroplane as sacrosanct and the property of the Air Force."

Here he is raising anew the whole question of the relations of the three Services, a subject too vast to be dealt with in the scope of two brief concluding chapters; but we find ourselves more in sympathy with him when he says that an organization which could be blessed, even as late as 1925, is not necessarily the best to-day. Equally, we are prepared to follow his line of argument when he expresses the view that effective re-organization should not involve the re-absorption of the Royal Air Force by the older Services.

Here is a theme for a further work, from a ready pen and live mentality; but, if he attempts it, we hope this able writer will avoid the captious tone which somewhat mars his latest work.

The Armies of the First French Republic and the Rise of the Marshals of Napoleon I. *Les Armées de la Moselle, du Rhin, de Sambre-et-Meuse, de Rhin-et-Moselle.* By the late Colonel Ramsay W. Phipps, formerly R.A. (Oxford University Press). 21s.

The study of the war waged by Revolutionary France down to Bonaparte's Campaign of 1796-97, in Italy, has long been unduly neglected. Colonel Phipps' work comes as a timely remedy to a serious deficiency in English military history. His present book is a continuation of the introductory volume that covered the story of the "Armée du Nord" and is fully up to the high standard of its predecessor.

The importance of the campaigns, beginning with that astounding "cannonade" of Valmy, in 1792, and ending with the curious battle of Fleurus, in 1794, lies in the amazing instances which they afford of the evil influence that may be exerted by Government interference, and by party politics in particular, on a plan of campaign. The earlier Revolutionary strategy was virtually settled by the politicians in Paris, who also intervened in the actual conduct of operations through representatives present at each headquarters. These representatives, moreover, possessed full powers, in fact if not in name, of causing any leader to be executed

in the event of his failure. Even after the Terror, in 1795 and 1796, things were going very much astray. Victory had come in spite of political meddling.

It was in this school that, as Colonel Phipps shows, the future Marshals of the Empire were trained, and it is only surprising that their education should not have suffered more than it actually did in such unsatisfactory conditions. It is amazing to read over and over again that men like Hoche, Kléber, Marceau, Saint-Cyr and Lefebvre should repeatedly have refused to assume any command above that of a division. Colonel Phipps's story makes the reason clear.

The general lessons of the campaigns are also truly important. They tally with those to be derived from the American Civil War of 1861-65 in respect of all the difficulties that surround the formation of "new" armies. The disastrous results of the election of officers by new regiments are fully exemplified in these French Armies, even though Colonel Phipps does not bring out this matter too clearly. Difficulties of a somewhat similar kind were said to have been experienced by various War Ministries in 1914-15. There are also some interesting details concerning the first use of a balloon in war at the Battle of Fleurus in June, 1794.

This volume is well worth detailed study. If so regarded, it may act as a useful corrective to any possible tendency to limit the reading of military history to masterpieces of war, such as Napoleon's campaigns of 1796, 1805 and 1806, or Allenby's operations in Palestine.

With a Women's Unit in Serbia, Salonika and Sebastopol. By I.

Elmslie Hutton, M.D. (Williams & Norgate, London, 1929). 12s. 6d.

This is a book which will appeal to all who wish to read of the everyday life in the Great War, or rather that aspect of it which affected the sick and the wounded. There is nothing morbid about the volume, nor does it contain any self-introspective matter such as has been repeated *ad nauseam* in many recent books. It is a healthy recital of duty done under sometimes hard and exacting conditions; the narrative is lively and modest.

The writer joined the Scottish Women's Hospital and with that unit first went to France in August, 1915, to serve at Troyes with French troops. Shortly after the Hospital was despatched to Salonika, where it arrived in time to participate in the retreat from Serbia. There it remained until the close of the war, when it took part in the forward movement into Serbia. It was at this time that the Hospital received the full brunt of an epidemic of typhus. This gruesome illness filled the Hospital, and the author has some graphic pages dealing with the matter. One sister succumbed to the disease.

In the after stages of the war the Hospital moved from Belgrade to Constantinople. Thence it ended by going into the Crimea to serve with Wrangel's anti-Bolshevik forces during their advance and retreat. These last episodes are full of interesting incident.

Altogether it is a most readable book, full of little touches that show literary instinct and appreciation of the unusual.

The Vicissitudes of Organized Power. By the Hon. Sir John Fortescue, LL.D., D.Litt.—The Romanes Lecture delivered in the Sheldonian Theatre 22nd May, 1929—(Oxford Clarendon Press, 1929). 2s. 6d.

Under this somewhat cryptic title, Sir John Fortescue has given a succinct epitome of the growth of the British Army. It is written in his usual fluent and

interesting style, while the tribulations which the soldier himself has undergone in the past are sympathetically narrated. The lecture displays both knowledge of the subject as well as judgment in the selection of detail. There is no allusion to any campaign except in so far as it may have affected the development of the forces of the Crown.

An important aspect of the lecture is the manner in which there is brought out the relations of the regular forces of the Crown with the troops maintained by the East India Company. Another important detail is the account of the creation of the Metropolitan Police Forces as a by-product of the duties once performed by the Army.

REGIMENTAL HISTORIES.

A Short History of the Duke of Cornwall's Light Infantry ; Its formation and Services, 1702-1928. (Devonport: Swiss & Co.). 1929. 1s.

This little history is replete with facts and is exceedingly well produced. It is a credit to the regiment. It is primarily intended for reading by the private soldier.

The 2nd City of London Regiment (Royal Fusiliers) in the Great War (1914-19). By Major W. E. Grey. (Published from the Headquarters of the Regiment, Westminster, London). 1929.

This is the history of a battalion of the 1st London Division of the Territorial Force during the Great War. The unit served in France from January, 1915, until the end and fought in all the main battles of the war. A 2/2nd Battalion was formed after the outbreak of war and this saw service at Gallipoli and in France. Being disbanded in 1916 it was replaced in the regiment by the 3/2nd Battalion; this latter unit also went to France. The 4/2nd Battalion became the Reserve Battalion of the Regiment.

The volume is well and clearly written. There are several good maps and a few appendices.

The Northern or Gordon Fencibles, 1778-1783. By H. B. Mackintosh, M.B.E., F.S.A.Scot. (Privately printed). 1929.

As one result of the disaster at Saratoga there were raised in Britain several regiments of Fencibles. Amongst these was the Regiment of Gordons which is the subject of this admirably got-up monograph. It was raised by Alexander, 4th Duke of Gordon, in 1778 and enjoyed a brilliant existence for the space of five years.

AIR.

The Air Annual of the British Empire. Edited by Squadron-Leader C. G. Burge, O.B.E., A.R.Ae.S.I. (Gale & Polden, Ltd., London). 21s.

This new publication is obviously modelled on Brassey's Naval and Shipping Annual, and none the worse for that; in fact it should become to the aeronautical

world what Brassey's Annual has been for so many years to the seafaring world, a review of the year's progress and a ready reference book of invaluable facts and figures.

The first of what should be very many volumes of this Air Annual, is launched with the benedictions of a number of distinguished persons connected with aviation, and encouraging messages from some of the High Commissioners in London of the Dominions, and of Southern Rhodesia. These latter and a section on "Empire Aviation," with an opening chapter by Mr. Amery, indicate a full appreciation of the Imperial character of this work and the subject with which it deals. This aspect is dealt with further in chapters covering aviation in Australia, New Zealand, Canada, South Africa and India.

The best known writers on aeronautical matters contribute to sections on Service and Civil Aviation, while technical experts in the first rank review British aircraft design, construction, engines and accessories. Valuable chapters are also devoted to Air Survey, Photography and Meteorology.

In a useful appendix of General Reference, we are glad to see that it is recognised that the Royal United Service Institution is one of the pioneers in "Societies and Institutes which include aeronautical subjects in their organization."

The editor is to be congratulated on a really monumental achievement, and the publishers on their enterprise and the excellent illustrations and general production which make up a very attractive volume.

The 2nd City of London Regiment (The Buffs) was formed in 1880. It was the first of the new regiments to be formed, and it was the first to be formed in the Buffs. It was the first to be formed in the Buffs.

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The Buffs are well and clearly written. There are several good maps and a few appendices.

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AIR

- THE AIR ANNUAL OF THE BRITISH EMPIRE, 1929. Edited by Squadron Leader C. G. Burge. 21s. 8vo. (Gale & Polden, Aldershot). Presented by the Publishers.
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